

# FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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## Flight.

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## EDITORIAL COMMENT.

### The Year that is Past.

With another year almost gone, it would not be fitting were we not to briefly traverse the story of the twelve months in some way, but so rapid is the march of events in aviation that the task has now become one of no inconsiderable difficulty. Marvel succeeds marvel, and wonder follows wonder with such bewildering rapidity that it is indeed hard to keep track of events as they occur, let alone to marshal them in their proper sequence after a lapse of time. Therefore, we do not propose to attempt to inflict on our readers a chronological survey of the happenings of 1913, but rather to point the moral of the progress that has been made since the end of 1912. Even that is not too easy to carry into effect, for flight has resolved itself into so steadily progressive a science that it is next to impossible to sectionise progress, so to speak, and it can only be dealt with in more or less general terms. For example, it is hardly possible to say that during the year there has been any marked change in the design of the aeroplane itself, or that any new and startling types have been evolved to upset any of our previously held ideas of construction. True, there has been progress,

but it is rather in the way of constructional detail than in new theory. Steel, for instance, is beginning to replace wood in constructional work, particularly in the case of machines designed primarily for military use, but this, again, is more an alteration in detail than anything else. Although it is perfectly true that the record of progress is as we have said, it really amounts to something very considerable in the way of advance, as witness the wonderful development of the biplane as a speed machine. The progress that has been made in what we have called constructional detail, plus an equally rapid advance in the movement towards engine reliability and efficiency, has rendered the type almost equal to the monoplane as a speed machine, besides investing it with other qualities equally desirable in the way of comparative safety and wide radius of action.

The advance of which we have spoken is discernible principally through the medium of the wonderful cross-country flights, which have been the main feature of the year, principally in connection with the great endurance competitions which have been held on the Continent, and in which continuous flights of a thousand miles have become almost commonplace by comparison. Not only does this point to an all-round advance in the construction of machines and engines, but to an even much greater extent the improvement in the skill of the pilots. So far as regards this country, we have not shared to an equal extent with France and Germany in the setting up of long-distance records, though some very fine flights—including world's records—have been made, particularly by members of the Royal Flying Corps. In this connection, however, it must be borne in mind that the conditions in England are not so favourable for long-distance cross-country flying as they are in the countries named, so that on balance we have no need to be discouraged at the progress that has been made. As a matter of fact, that progress has, we think, been even relatively greater at home than abroad. Certainly the British constructor, as we recently had occasion to remark when commenting upon the Paris Aero Show, has more than held his own, and it is now possible to say that even if we cannot plume ourselves upon having taken the lead, we can at least claim to be well up in the front of the world's industry. Nor are our pilots a whit behind those of the Continent, either in skill or the nerve which is so essential for the work to be done.

In the matter of aerial defence, a lot of useful progress has been made during the year, though not nearly as much as we should have liked to see. However, it is at last evident that the authorities have grasped the importance of the part aviation is destined to play in the wars of the future, and we may hope that this will lead to the strengthening materially of our aerial forces which we feel to be so necessary to our safety as a nation. The Naval Wing of the R.F.C. has been particularly active during the year, though the "Silent Service" has not had much to say about it. A chain of seaplane stations is being gradually established down the East Coast, and the necessary machines either acquired or placed on order; two dirigibles have been purchased, and others are under construction at the works of Messrs. Armstrong Whitworth and Messrs. Vickers. Nothing has been allowed to transpire as to the type or number of the airships under construction, very wisely as we think. Even though the knowledge of the Admiralty programme is withheld from motives of policy, it is at least comforting to know that there is a programme, and that it is being pressed steadily towards completion.

On the military side, the programme and work has been of a more open nature, which is understandable when the declared policy of the authorities is kept in mind. That policy is to place the aerial defence of the country in the hands of the Navy, and rather to utilise the activities of the Military Wing to the provision of sufficient squadrons to accompany the Expeditionary Force overseas, and at the same time to sufficiently provide for the aerial equipment of our defensive forces in case an invasion became an accomplished fact. Some remarkable work was done by officers of the Military Wing during the Army manoeuvres in the autumn, and again during the manoeuvres of the Irish Command. Besides this, a great deal of detachment work of a very satisfactory nature has been done, and we are able to feel that, strength for strength, we possess a Flying Corps which is fully equal in the quality of its *personnel* to that of any other power.

Unfortunately, we have to deplore the loss through accidents of quite a number of pilots who can ill be spared from the movement, but there is one comforting reflection to be taken into account, which is that the number of such accidents in relation to the distance flown shows a very marked decrease, which is another way of saying that flying becomes safer every day. For this the general advance in construction must be credited with a good deal. Machines no longer collapse in the air as they had an unfortunate habit of doing at an earlier date in the history of aviation. Then, again, the standard of skill is becoming much higher, besides which, pilots have begun to appreciate the fact that the aeroplane is an essentially safe machine when it is not interfered with unduly in flight. The demonstrations of Pegoud and Hucks in their "looping the loop" performances have shown up this quality of safety in a most remarkable manner, and though these same performances were decried as dangerous, and a tempting of Providence, it is an undoubted fact that they have had an enormous influence for good on what may be termed the general safety of flying. From that standpoint we entirely decline to associate ourselves with the view that these performances were of the "circus" variety against which we have in the past set our faces most strenuously. We have always been against mere "stunt" flying when there were no useful lessons to be gained from it, but these demonstrations of the inherent stability of the aeroplane have certainly proved to be of the utmost value. Not that we would support anything in the way of universal emulation. The demonstrations have been made, and the lessons marked and assimilated, so that they have passed from the useful stage, and may be allowed to drop.

Taken all round, it may be said that 1913 has been a remarkable year in the history of flight, without being in any sense epoch-making. Its keynote has been one of steady progress rather than of revolution, which we take to be all for the good of the movement.

It only remains now for us to wish all our readers a happy, safe and prosperous flight through the year that is to come.

## EDOUARD BAUMANN.

PILOT.

ALTHOUGH he is of Swiss nationality, all Baumann's flying has been done over here, and his connection with aviation dates back to the early days. He was associated with Mr. Hal Piffard in his experiments with a good many different types of gliders and aeroplanes, including the waterplane which was tested at Shoreham. Later he joined Mr. Ewen at Lanark, and when the Ewen

school came south to Hendon, came with it. After doing some rolling on an old Blériot, he practised on a 28 h.p. Deperdussin, and made the first part of his *brevet* tests on it. He finished the tests on a Caudron biplane and it is as a very fine pilot of the latter machine that he is best known at Hendon. On Thursday of last week on one of them he was flying 7,000 ft. up. THE HAWK.

### THE ROYAL FLYING CORPS.

The following appointments were notified in the *London Gazette* of the 12th inst. :-

**R.F.C.—Military Wing.**—The undermentioned Lieutenants to be Flying Officers, and to be seconded: Hubert D. Harvey-Kelly, the Royal Irish Regiment. Dated November 11th, 1913. Llewelyn C. Hordern, the Lancashire Fusiliers. Dated November 14th, 1913.

The following were notified in the *London Gazette* of the 16th inst. :-

**R.F.C.—Military Wing.—Special Reserve of Officers.**—The undermentioned Second-Lieuts. (on probation) are confirmed in their rank: Edward N. Fuller and Christopher W. Wilson.

The following appointment was announced by the Admiralty on the 17th inst. :-

Lieut. J. T. Cull, to "Pembroke," additional, for course of instruction at Central Flying School, January 27th, 1914.

The following were notified in the *London Gazette* of the 19th inst. :-

**R.F.C.—Military Wing.—Establishments.**—The undermentioned officers, on appointment for continuous service, to be removed from the Reserve: Hubert D. Harvey-Kelly, the Royal Irish Regiment. Dated November 11th, 1913. Llewelyn C. Hordern, the Lancashire Fusiliers. Dated November 14th, 1913.

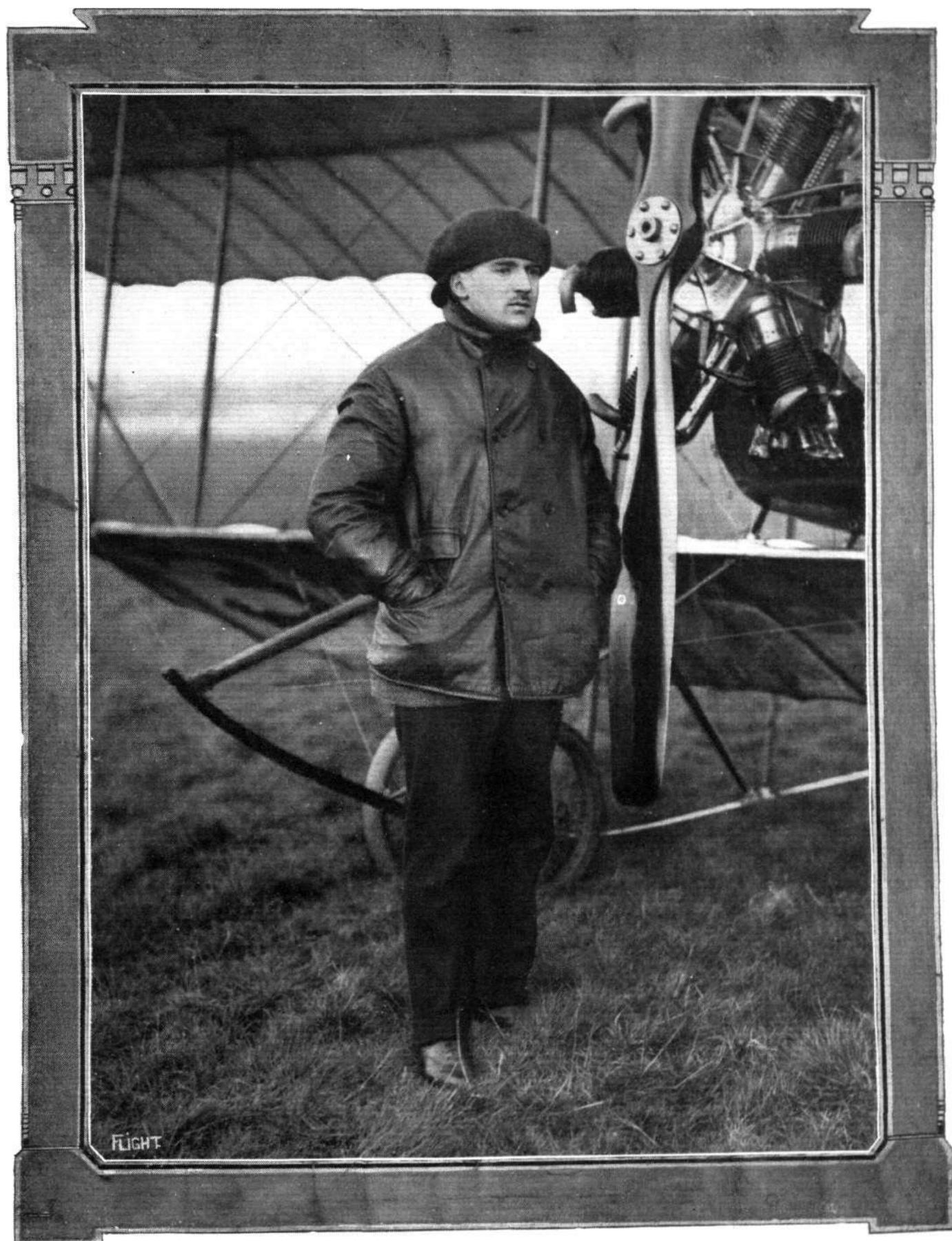
The following appointments were announced by the Admiralty on the 19th inst. :-

Lieuts. A. P. Gaskell, to the "Pembroke," additional, for the Isle of Grain Naval Station, as Flying Officer, to date January 1st; Brodribb, to the "Pembroke," for Isle of Grain Air Station (Staff), as Flying Officer; A. J. Miley, to the "Pembroke," for Calshot Naval Air Station, temporary, as Flying Officer; E. Osmond, to the "Pembroke," for Naval Flying School, Eastchurch (Staff), as Flying Officer; and W. G. Sitwell, to the "Pembroke," for Yarmouth Naval Air Station, as Flying Officer, to date January 1st.

Capt. H. Fawcett, R.M.L.I., to the "Pembroke," additional, for the Fifth of North Naval Air Station, as Flying Officer.

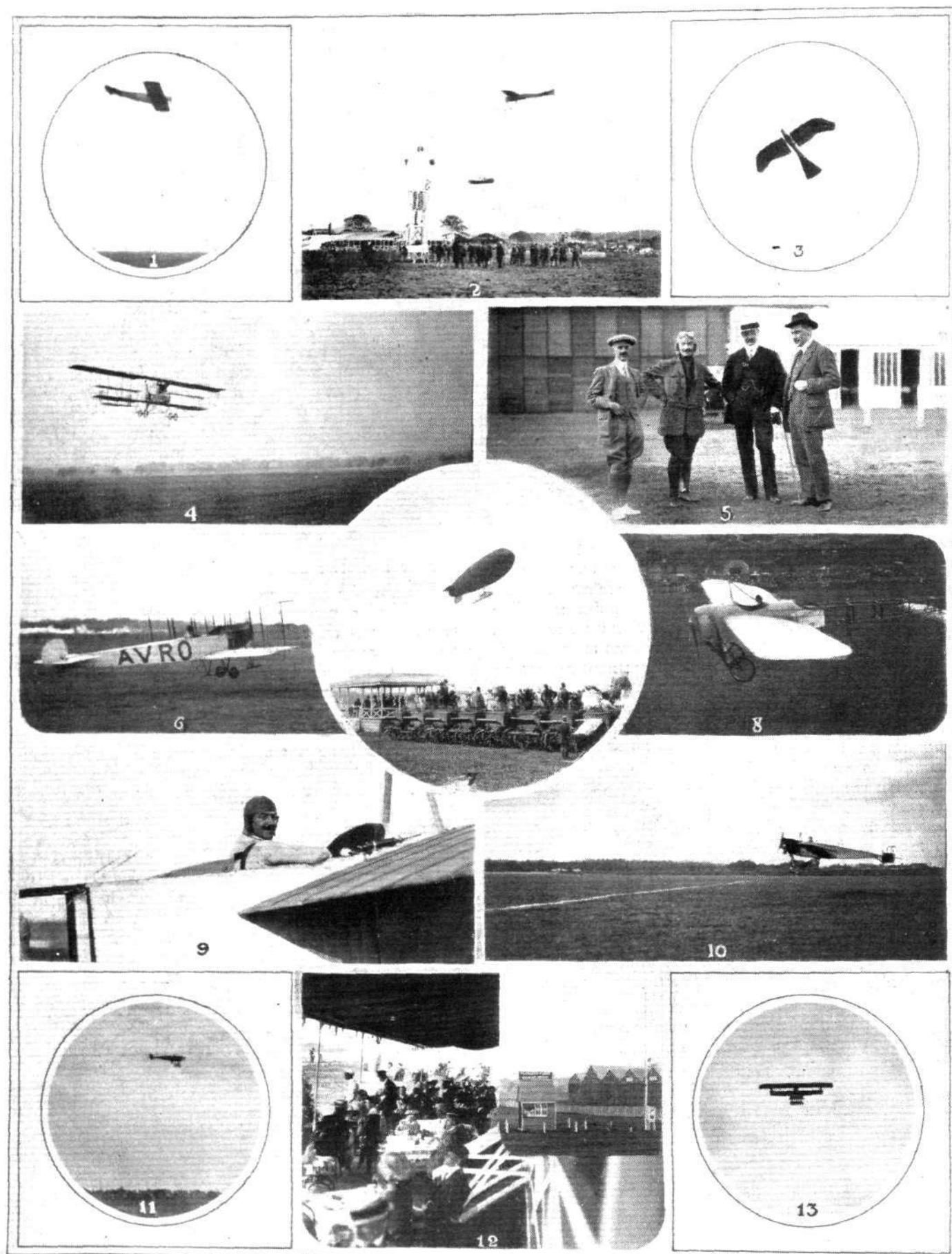
Sub-Lieuts. (Royal Naval Reserve) R. E. C. Peirse and T. A. Rainey, to be graded Flying Officers, October 1st, and to "Pembroke," additional, for Isle of Grain Naval Air Station, as Flying Officers, January 1st, 1914; I. G. V. Fowler, to "Pembroke," additional, for Isle of Grain Naval Air Station (Staff), as Flying Officer; R. H. Kershaw, to "Pembroke," additional, for Yarmouth Naval Air Station, as Flying Officer; and D. G. Young to "Pembroke," additional, for Isle of Grain Naval Air Station, temporary, January 1st, 1914.

MEN OF MOMENT IN THE WORLD OF FLIGHT.



M. EDOUARD BAUMANN.





SOME REMINISCENCES OF 1913.—1. The Dyott monoplane flying at Hendon. 2. Finish of Shell Handicap—Lieut. Porte (100 h.p. Deperdussin) and R. Slack (Blériot). 3. Plan view of the Etrich seen from below. 4. Pierre Verrier flying the Maurice Farman "hands off." 5. The pioneers of upside-down flying in England—left to right: MM. Chereau, Pegoud, Blériot, and Major Lloyd. 6. The Avro biplane leaving the ground. 7. The King's Birthday celebrations at Aldershot. 8. W. L. Brock flying the 80 h.p. Blériot at Hendon. 9. Pegoud about to start. 10. Gustav Hamel starting in the Aerial Derby. 11. Gustav Hamel winning the Aerial Derby. 12. Hendon of to-day and yesterday. 13. The aerobus flying with a mechanic on each wing tip.



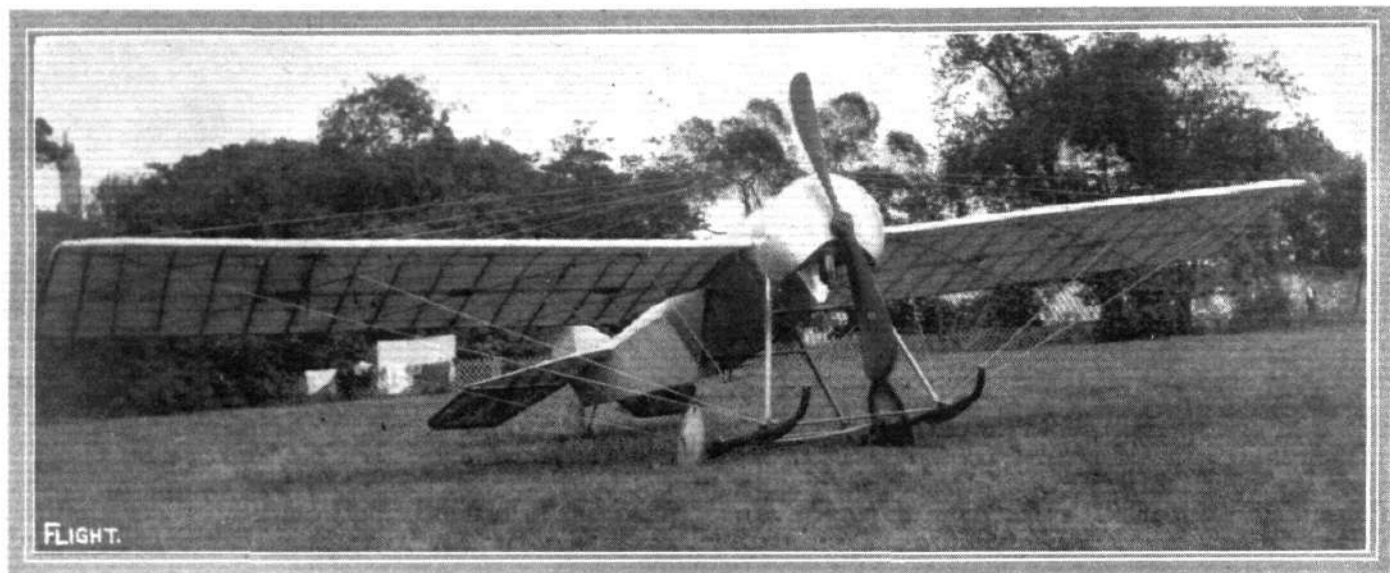
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SOME REMINISCENCES OF 1913.—1. A close finish of a race at Hendon—Marty, on the Morane-Saulnier, diving under Brock on the Blériot. 2. Flying at sunset—a scene at Hendon. 3. Beattie banking on the Wright. 4. Arrival of the Etrich from France. 5. Hendon pilots of 1913. 6. The new Avro biplane. 7. A typical crowd at the London Aerodrome. 8. The new 80 h.p. Sopwith biplane. 9. Gilbert leaving Hendon for his non-stop Paris flight. 10. Pegoud starting to loop the loop at Brooklands. 11. Chevilliard banking. 12. Spratt on the 60 h.p. Dep. 13. Brindejone starting for his attempt on the English altitude record.

# THE 80 H.P. BLACKBURN MONOPLANE.

ALTHOUGH the doings of the new Blackburn monoplane have not received such publicity as doubtlessly would have been the case had the flights been made in the neighbourhood of one of the well-known aerodromes,

hitherto turned out by the Blackburn firm. The *fuselage* is streamline in shape and triangular in section, and is built up in the form of a lattice girder. The front part is of English ash, and is covered with sheet aluminium,

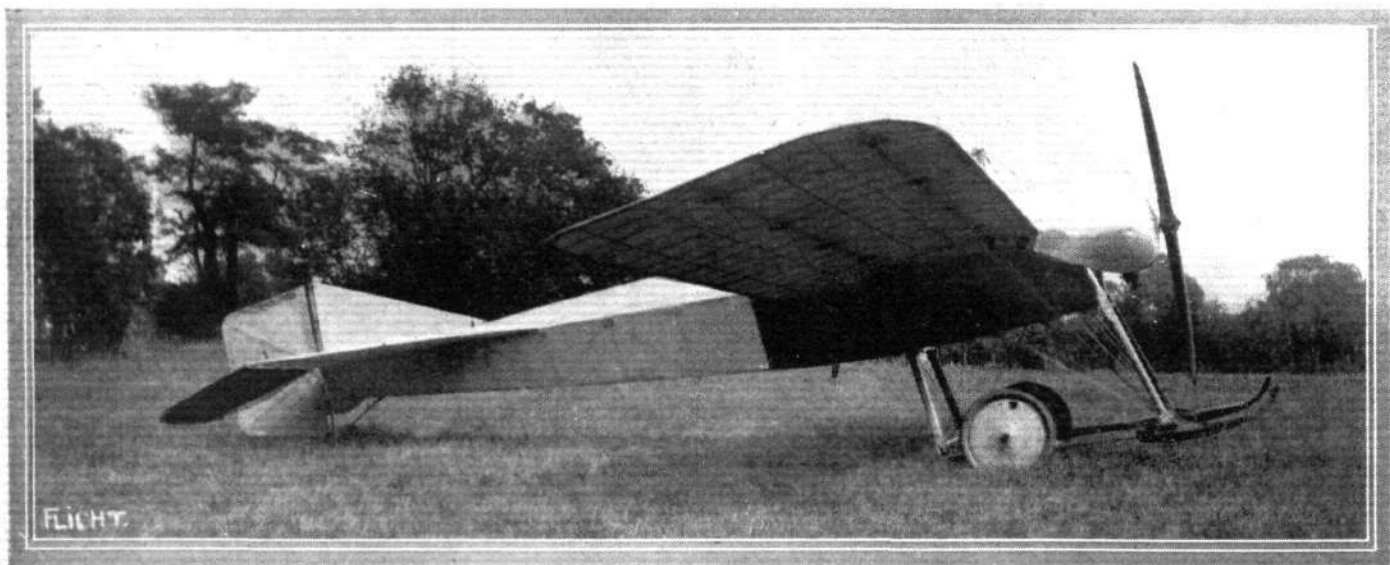


Front view of the 80 h.p. Blackburn monoplane.

this machine has nevertheless done a considerable amount of flying in the north of England, and has, it is to be hoped, helped in no small measure to arouse the interest in aviation in that part of the country. A machine of this type, it will be remembered, was delivered to Dr. M. G. Christie in the middle of August and—piloted by Mr. Harold Blackburn—has been flying regularly since then, the distance traversed aggregating 1,800 miles, while over 120 passengers have been carried. It was this same machine which Mr. Blackburn flew

giving it additional strength and reducing the head resistance. The engine is covered over for about five-eighths of its circumference by a beaten aluminium cowl, which is continued to form a scuttle dash. This effectively prevents the exhaust from the engine reaching either pilot or passenger.

The main planes are rectangular in form, and of a curvature designed to give maximum lift for a minimum drift. The main spars on which the ribs are built up are of the finest selected straight-grained English ash,



Side view of the 80 h.p. Blackburn monoplane.

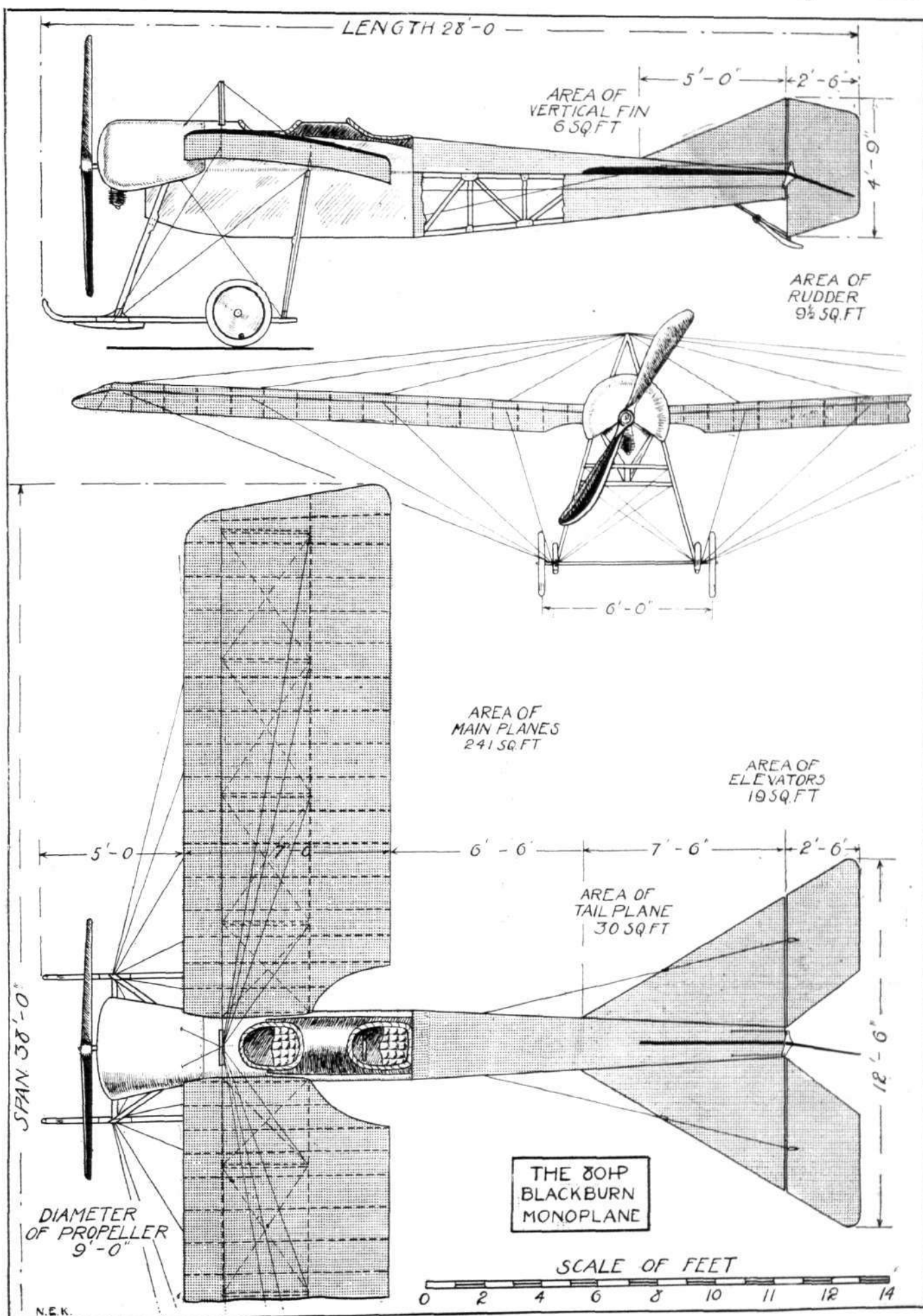
with Dr. Christie as a passenger in the inter-county air race, for a distance of 100 miles, the Cup being won by Blackburn.

Constructionally this new machine differs considerably from the older type, and is a distinct advance on anything

the spars being machined out of the solid to the most efficient section, and not built up.

The webs are of silver spruce cut out to their true form and built up with cottonwood flanges, forming the ribs to which is attached the fabric. These ribs are

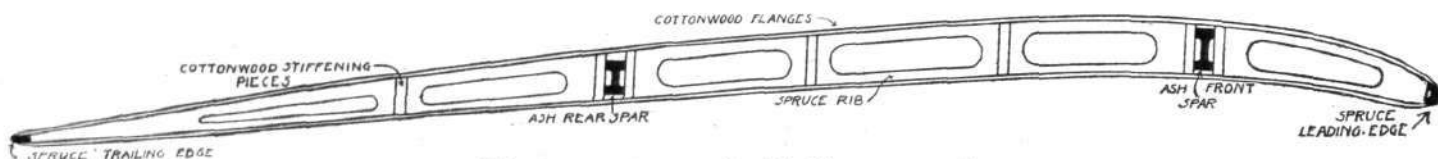




THE 80 H.P. BLACKBURN MONOPLANE—Plan, side and front elevations to scale.

strengthened by cottonwood distance pieces where pierced for spars, and are equally spaced by means of leading and trailing edge laths. The whole of the woodwork is well varnished before being covered with fabric, and is strongly braced internally to take the backward thrust imposed on the planes in flight. The planes are covered

cables. Three upper tie wires are attached to the front spar from the pylon. The breaking load of the upper wires is not less than two-thirds that of the lift wires. The three warping wires are attached to one main wire passing over pulleys on the rear chassis. The rear spar is, therefore, not bent when the wing is warped, but has



Rib construction on the Blackburn monoplane.

with finest quality fabric, which is fitted down with split cane beading.

The machine is supported on a very strong chassis composed of two long skids connected up to the fuselage by heavy ash struts. The skids and struts are of specially selected straight long-grained English ash, thoroughly seasoned and designed to withstand alighting on rough uneven ground. To the skids are attached a pair of wheels whose axle is held down by strong elastic shock absorbers, thus preventing shocks due to landing being transmitted to the main frame. The wheels are built up with specially wide hubs to resist any side thrust, and are streamlined with fabric.

The fabric with which the fuselage and planes are covered is very strong compared to its weight. It is carefully stretched on the framework, and is rendered oil- and water-proof by the application of a non-inflammable solution, which impregnates and tightens the fabric and gives a smooth and highly-polished surface.

The standard type of control is fitted, *i.e.*, foot bar for operating rudder, to-and-fro motion of vertical column for operating elevators, and rotating handwheel for lateral balance. All control wires are duplicated.

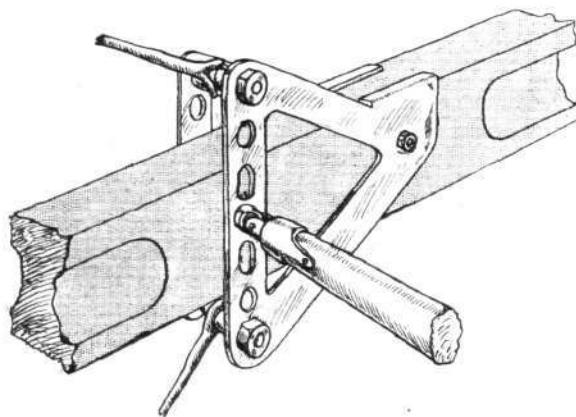
An 80 h.p. Gnome engine is mounted in front of the fuselage, the supporting plates being of pressed steel. Engine controls are fitted on the right hand of the pilot's seat, and in a convenient position for rapid operation.

The seats for pilot and passenger are arranged in tandem, the passenger in front being situated over the C.G., thus enabling the machine to be flown either with or without a passenger without altering the balance.

For taking the weight of the machine in flight, each front spar is stayed to the chassis by three stranded

an angular movement about the hinge on the fuselage; the corresponding top wires pass over a pulley on the pylon. All cables have a factor of safety of ten, and are spliced and bound with galvanised steel wire.

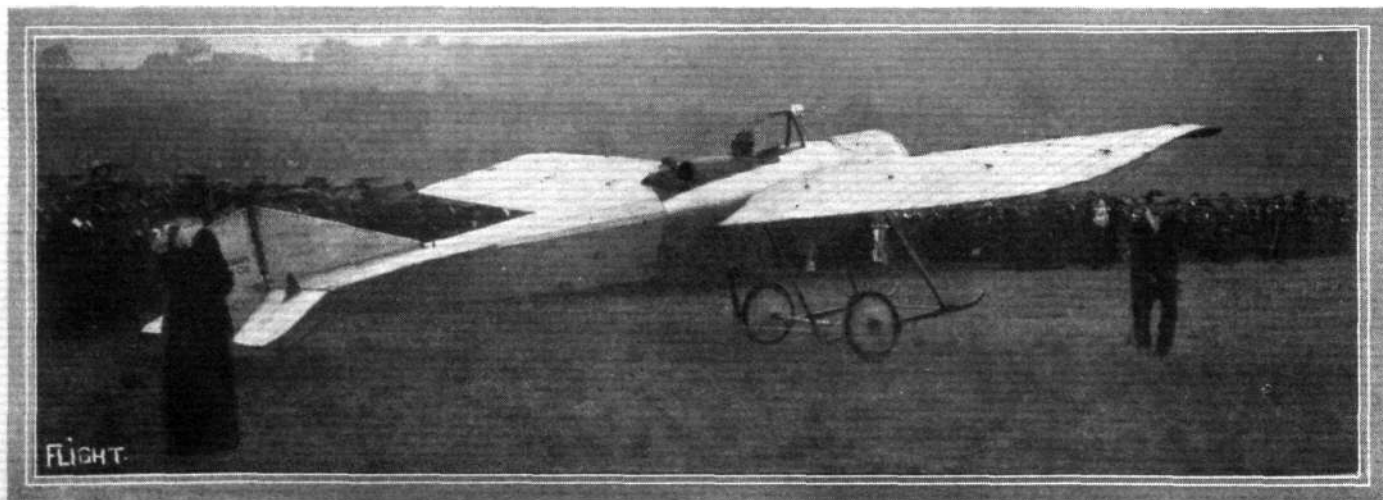
A Blackburn propeller of 9 feet diameter, built of specially selected laminated walnut, is coupled direct to the engine.



Attachment of bracing cables to main spar.

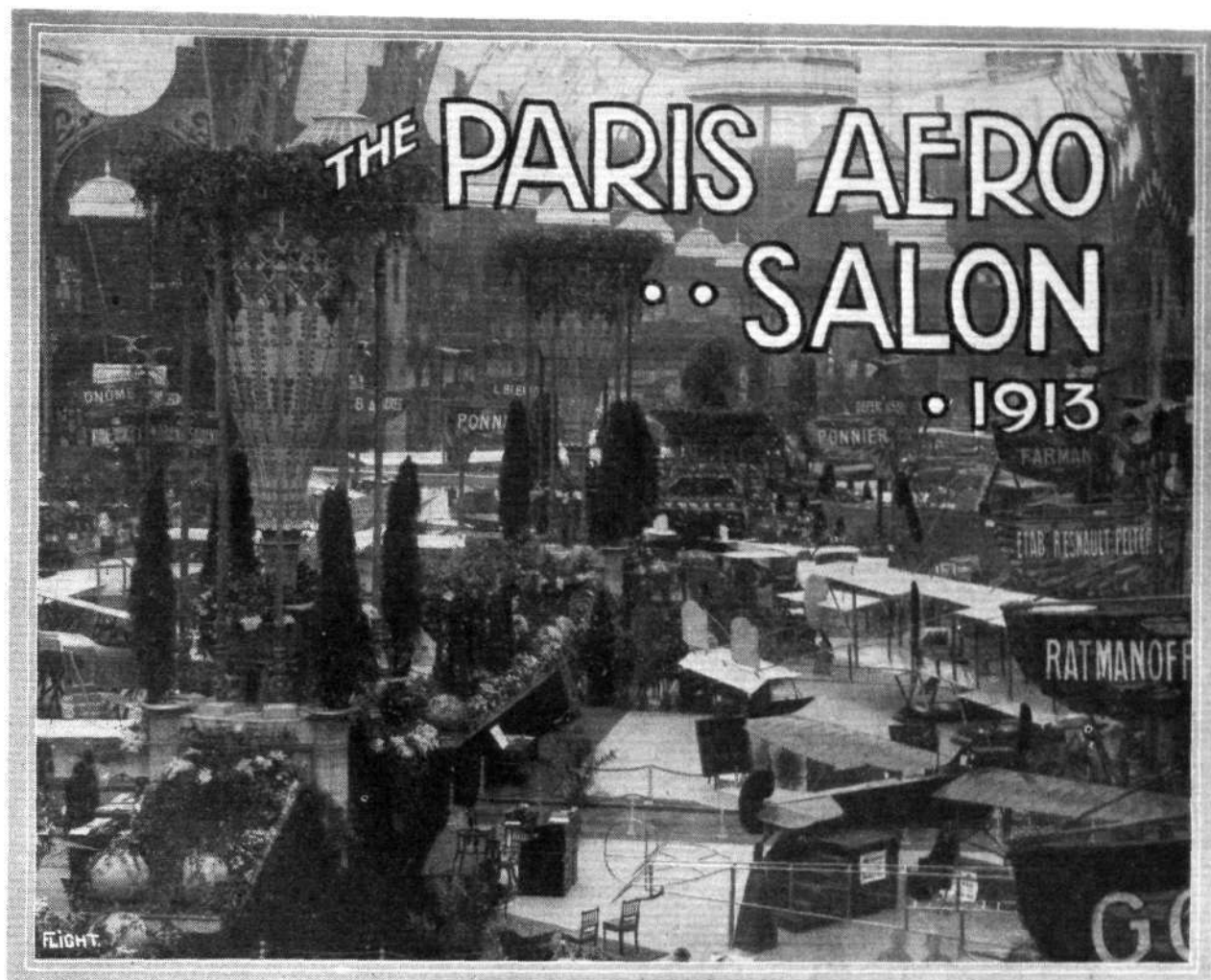
A lifting tail of 30 sq. feet area is fitted. Rudders and elevators are double surfaced.

The accommodation for both pilot and passenger is very comfortable, and a scuttle is fitted up to each seat which prevents the force of the wind from being uncomfortable on the pilot's and passenger's faces. The speed of the machine is 70 m.p.h., and the gross weight 1,500 lbs.



View from behind of the 80 h.p. Blackburn monoplane.



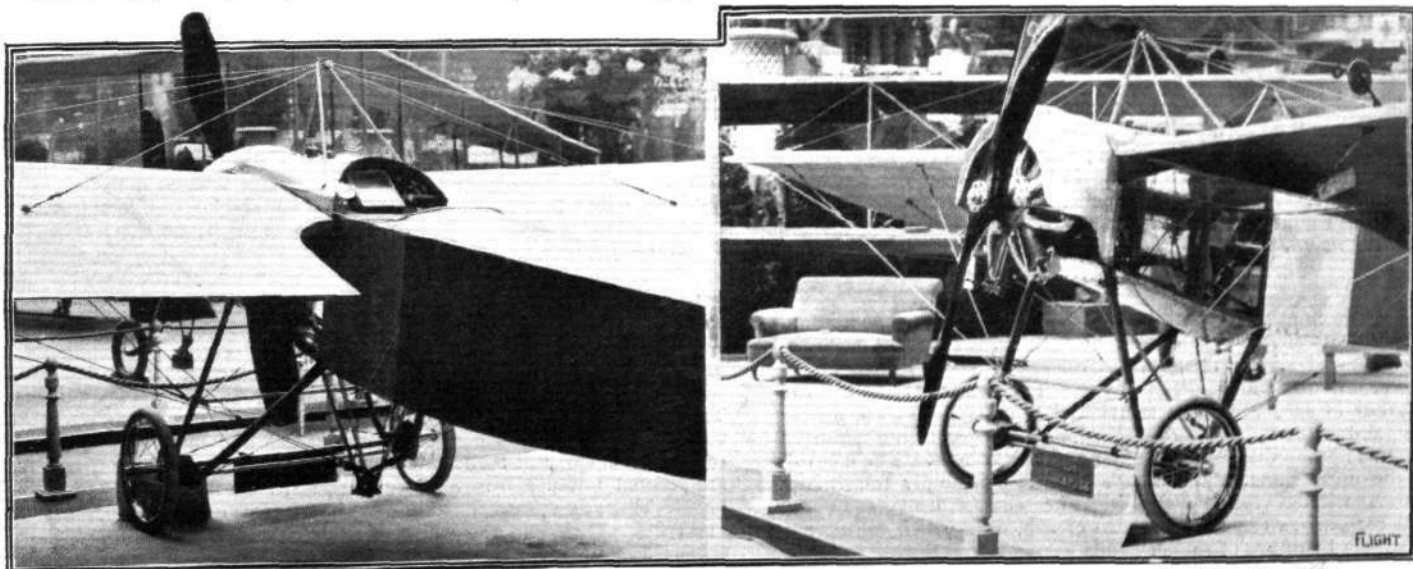


### THIRD ARTICLE. BATHIAT-SANCHEZ.

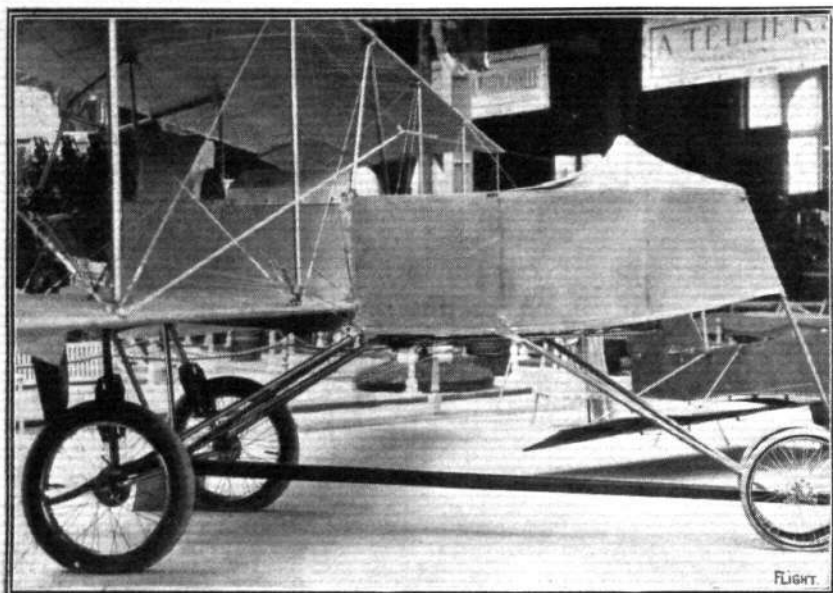
The Bathiat-Sanchez firm are showing two machines, a monoplane of quite orthodox type and a biplane on somewhat original lines. The monoplane is similar to the one flown by Lieut. Morel on his tour of France. It is fitted with a 7-cylinder 60 h.p. Le Rhone engine, mounted on overhung bearings in the nose of the fuselage. This structure, which is of rectangular section, is built up in the usual way of four *longerons* of ash, connected with struts and cross-members of spruce, and diagonal cross wiring. The chassis is of a very simple type, consisting of two pairs of ash struts carrying two short skids, from which is slung the single tubular axle carrying the wheels. The main planes, which are set at a slight dihedral angle,

are hinged to the *fuselage* by longitudinal bolts passing through the inner ends of the main spars.

Inside the *fuselage*, and almost on line with the trailing edge of the wings, is the pilot's seat. In front of him is a small dash, fitted with the usual instruments for cross-country work. The controls consist of a single tubular lever, which works the warp and elevator, whilst a pivoted foot-bar operates the rudder. In order to provide the pilot with a better view of the ground underneath, the trailing edges of the wings have been cut away in the proximity of the *fuselage*.



THE BATHIAT-SANCHEZ MONOPLANE.—On the right the chassis and engine mounting.

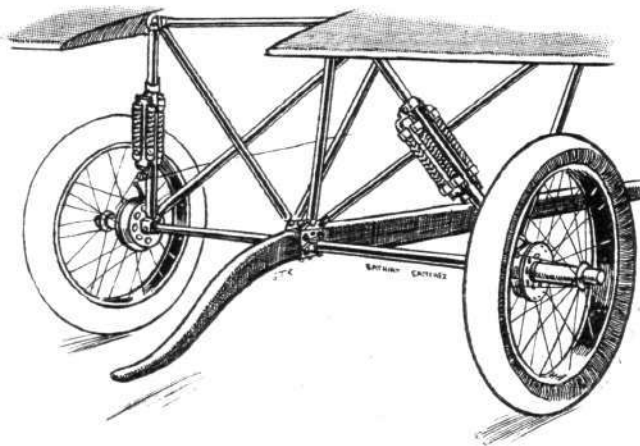
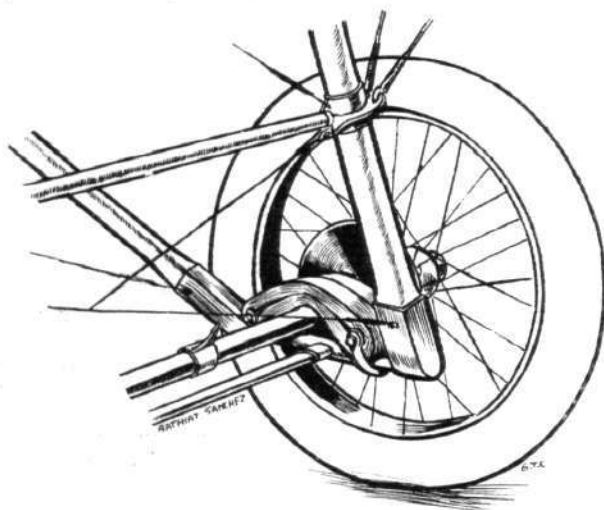


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## Nacelle and chassis of the Bathiat-Sanchez biplane.

Underneath the rear portion of the *fuselage* are mounted the tail planes, which are somewhat reminiscent of the Blériot, and consist of a fixed cambered plane, to the trailing edge of which is hinged the elevator. The rudder is pivoted around the stern post of the *fuselage*. Some distance in front of the tail planes is a small skid, which protects the tail planes against contact with the ground.

The chassis, which is of somewhat unusual type, consists of two main wheels mounted on stub axles and sprung by rubber shock absorbers, while under the nose of the *nacelle* and supported on another structure of steel tubes, are two smaller wheels. A very stout wooden skid connects the axles of the two pairs of wheels, and terminates at the back in a down-swept heel which takes the place of the ordinary tail-skid. The accompanying illustrations will, we think, explain all the details of the chassis. One point to which we wish to call attention, is the fitting of band brakes to the two main wheels. These brakes are operated by means of a lever on the right hand side of the pilot's seat. For starting the machine the pilot applies the brakes by pulling the lever backwards, and when



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## DETAIL OF THE SPRINGING OF THE BATHIAT-SANCHEZ MONOPLANE.—On the right the rear portion of the biplane chassis

The biplane exhibited by this firm is on more original lines, and belongs, as will be seen from the accompanying illustrations, to the "pusher" type. It is driven by a 70 h.p. Renault engine, mounted on two transverse steel tubes resting in lugs on the upper *longerons* of the *nacelle*. As usual, the propeller is mounted on the cam-shaft, and is thus running at half engine speed. The tanks are mounted inside the *nacelle* in front of the engine, while well out in front are

his engine is running satisfactorily he releases the lever, and the machine starts. The workmanship in both machines is very good, but the biplane, built as it is of steel practically throughout, gives the impression of being rather heavy, although it is said to have attained, with a 70 h.p. Renault engine, a speed of 102 kilometres per hour, and to have climbed to an altitude of 1,000 metres in 14 minutes.

## BOREL.

Three machines are exhibited on the Borel stand—one military tandem two-seater, a hydro., and the "Ruby." The land machine, which is fitted with a 100 h.p. L.U.C.T. engine of Italian manufacture, is of the standard Borel type. The *fuselage* is built up of *longerons* of ash, while the struts and cross-members are ash in front and spruce in the rear portion. The seats are arranged tandem fashion, the pilot occupying the rear seat. The controls are the usual Borel, and may be said to be simply the Blériot controls without the "cloche." The chassis consists of ash struts carrying two short skids, also of ash, from which are sprung the wheels by means of rubber bands wound round the axle and the skid. The hydro-monoplane is also a tandem two-seater and is

similar to those now in use in the Navy. It is driven by an 80 h.p. Gnome engine mounted in front of the *fuselage* on double bearings, of which the front one can be detached by undoing two bolts, thereby facilitating the operation of removing the engine. The *fuselage* is exactly similar in construction to that of the land machine. The chassis consists of a structure of streamlined steel tubes, which carry at their lower ends the two main floats. These are pivoted round a transverse tube mounted on the front chassis struts, and are sprung at the rear by means of rubber shock absorbers. Owing to the width of the chassis the angle of the lift wires is extremely good, the inner one being almost vertical.

The pilot's and passenger's seats are arranged tandem fashion,

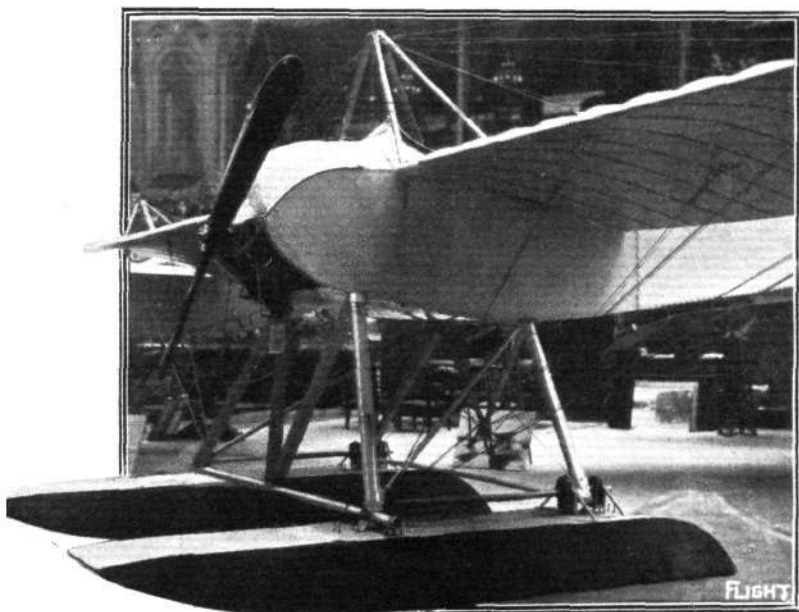
each in a separate cockpit, and the controls are of the usual Borel type. A small float, which turns with the rudder, enables the machine to be steered on the

water at slow speeds.

The wings are attached to the fuselage by two bolts passing through the spars, the bolt through the front spar being vertical, while the rear spar bolt is horizontal to allow of the wings being warped without bending the spar. In order to provide a better view in a forward and downward direction, the leading edges have been cut away for a distance of a couple of feet on each side of the fuselage.

The remaining machine—the “Ruby”—is undoubtedly the most interesting on the stand, as it represents a very radical departure not only from usual Borel design, but from aeroplane design in general. The *raison d'être* of this machine is the consistent demand of the military authorities, for a machine in which the propeller is mounted

central part of the fuselage, and between the two planes, is mounted the engine—a 50 h.p. Gnome—which drives, through a long shaft, a small propeller situated behind the tail-planes. Where the four longerons converge in the rear of the fuselage, is a ball thrust bearing which relieves the long shaft of all end thrust. In the front part of the fuselage are arranged the seats for the pilot and passenger, the pilot occupying the front seat. In front of him is a Hotchkiss machine gun mounted on the apex of a structure of three steel tubes secured to the nose and upper longerons of the fuselage respectively. Control is by means of a single central steel tube, which operates the warp and elevator, whilst a pivoted foot-bar actuates the rudder.

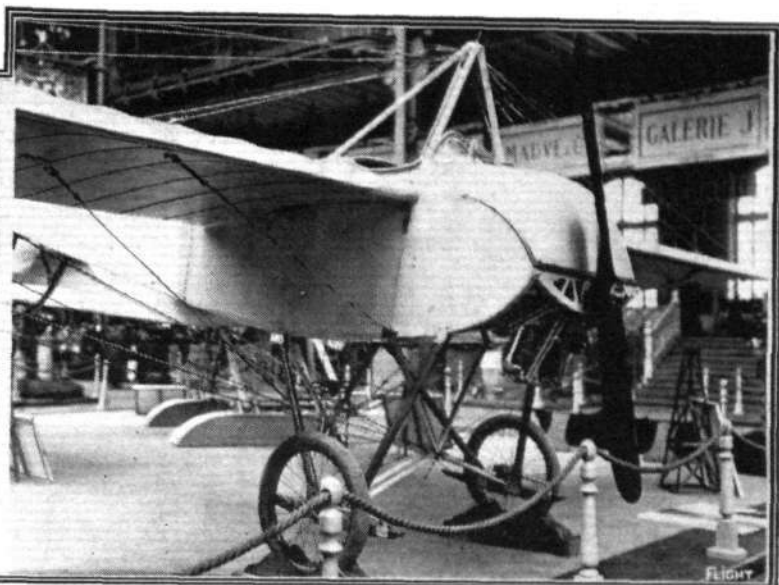


Borel hydro-monoplane.

behind the main planes, while the pilot's and observer's seats are situated well out in front, partly to facilitate observation and partly to allow of a gun being mounted in such a manner that it may be fired in all directions without the propeller interfering with it.

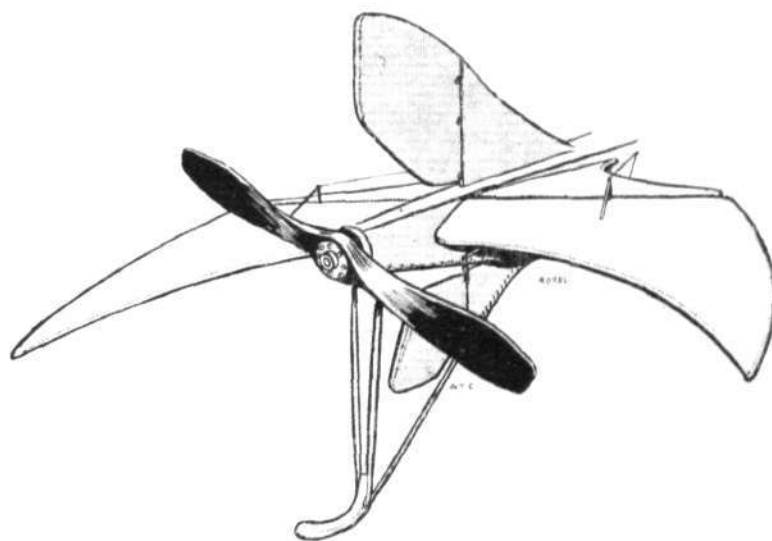
The fuselage, which is of rectangular section, and which tapers gradually towards the bow and the stern, is built up of four longerons of ash, connected by struts and cross-members of spruce. In the

The first impression one receives of the Breguet hydro-biplane exhibited is one of strength and power, and a closer inspection confirms the correctness of this impression. In its general lines this machine resembles the previous Breguet hydros., but an examination of the constructional details soon reveals numerous improvements which almost totally rectify most of the points that met with adverse criticism in earlier machines of this make.



On the left the Borel “Ruby”; on the right the Borel military monoplane.

“Flight” Copyright.



The propeller and tail planes of the Borel “Ruby.”

“Flight” Copyright.

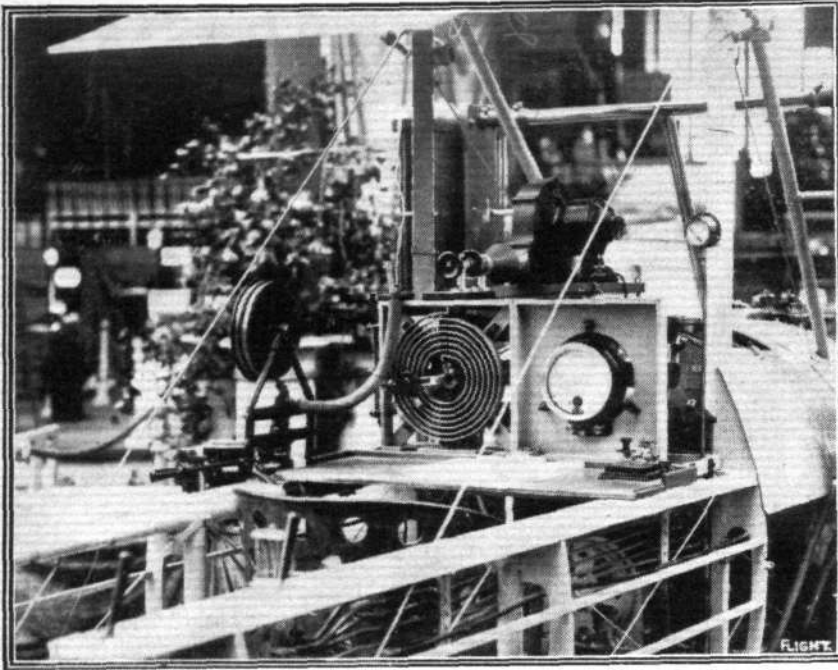
The chassis is of a very simple form, and consists of two pairs of ash struts, each pair forming a V. Two stub axles, which are pivoted on another pair of V struts, and work in slots between the chassis struts, are sprung from these by means of rubber shock absorbers.

The tail planes, which are of rather unusual shape, as well as the tail skid, are illustrated by one of the accompanying sketches.

#### BREGUET.

The fuselage, which is still built of steel practically throughout, is constructed on a quite different and greatly improved principle. It will be remembered that in the earlier machines the rear portion of the fuselage consisted of a single steel tube stiffened with wire bracing which, whilst probably perfectly safe as far as bending stresses are concerned, could not be all that was to be desired for torsional strains. In the present machine this single tube has been





"Flight" Copyright

Observer's seat and wireless installation on the Breguet.

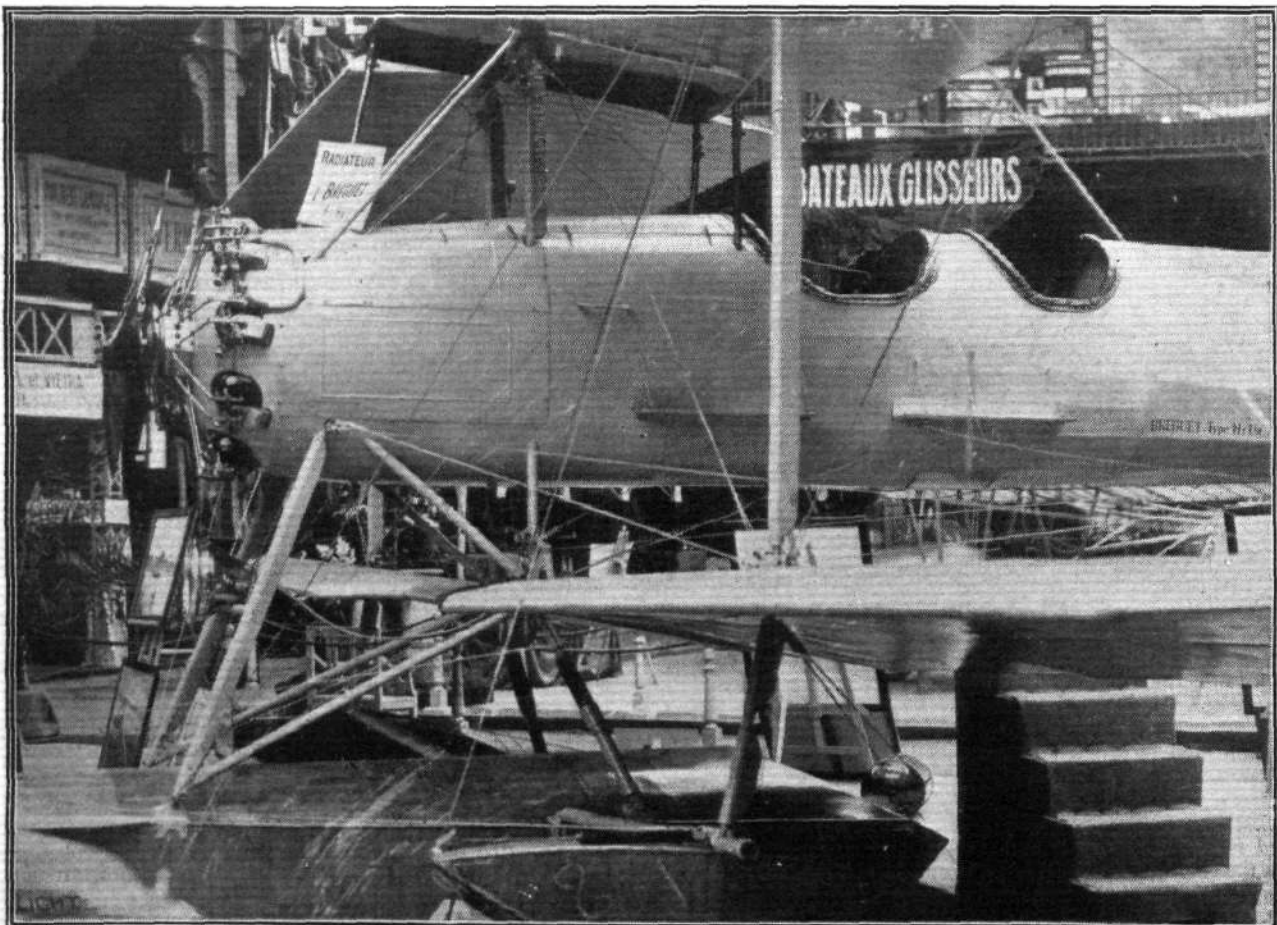
supplanted by four thinner steel tubes forming a girder in the more orthodox way with struts and cross members and diagonal wire bracing. On this steel structure are mounted wooden distance pieces connected by longitudinal stringers, which gives the *fuselage* its streamlined form, the whole being afterwards covered with fabric. The two seats are arranged tandem fashion, the pilot occupying the front one. In front of him are the controls which consist of a rotatable handwheel for steering and elevation and

descent. A foot-bar actuates the *ailerons*, with which one is pleased to note that this machine is fitted. Another improvement has been effected in the wing construction, as the flexible mounting of the ribs on the tubular spars has been discarded. One cannot help wondering, however, why M. Breguet does not go a step further and employ two rows of struts, which method of construction would increase the strength immensely and more than compensate for the extra weight and head resistance of a few extra struts. However, a diagram displayed on the stand shows a loading test, which appears to have proved that the new wing construction possesses ample strength for any practical purpose.

The machine is supported on the water by a big central float and two smaller ones under the first pair of inter-plane struts. The centre float is attached to the *fuselage* by four steel tubes, of which the rear pair have coil springs introduced in them, while the front pair forms a swivelling joint with the float, thus providing springing of the rear portion of the main float. A small tail float protects the tail planes against contact with the water. The engine—a 130 h.p. Salmson radial water-cooled motor—is mounted in the nose of the *fuselage* on steel bearers, which are further strengthened by two tubes running up to the upper ends of the two inner plane struts. The radiator, which has been given a shape resembling that of a wing section, is mounted in the place usually occupied by the centre part of the upper plane, a position which ought to combine the advantages of little head resistance and effective cooling.

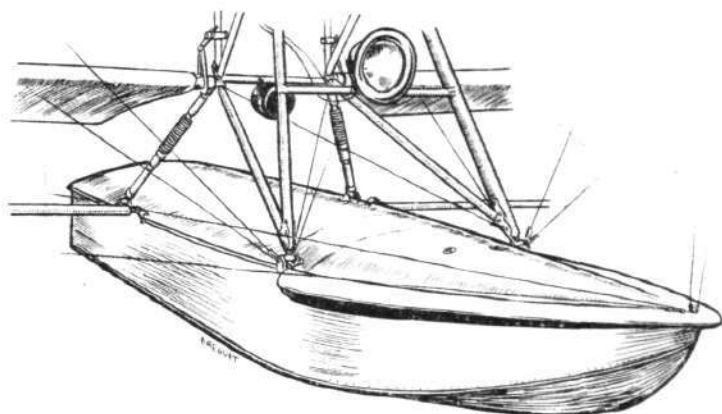
In order to facilitate alighting in the dark, a strong headlight has been fitted on a transverse tube between the two front chassis struts. The current for this headlight is furnished by a "Radios" dynamo.

The tail planes are of the usual Breguet cruciform type, and are attached to the *fuselage* by means of a universal joint. A very large tail fin runs along the top of the *fuselage* from the passenger's seat back to the tail. The object of this fin, which is not fitted on



The Breguet hydro-biplane.

"Flight" Copyright.



"Flight" Copyright.

Main float of Breguet hydro.

## THE FRANCO-BRITISH AVIATION CO., LTD.

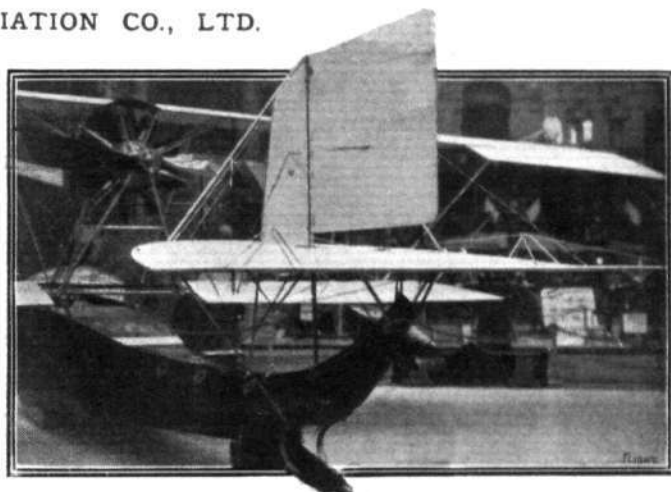
are exhibiting the only two flying boats to be seen at the Show. One of them, of which only the boat and the centre portion of the wings is shown, is the actual machine which won the long-distance prize at Deauville. It is fitted with a 130 h.p. Salmson engine. The other is a new type fitted with a 9-cyl. 100 h.p. Gnome. A comparison of the two machines soon shows that the new machine is a great improvement on the older one, which undoubtedly was very good in its time, but so swift is the progress in aviation that the type of yesterday is antiquated to-day. The boat is the most interesting part of the 100 h.p. machine, and constructionally it is built up of a framework of ash, which is covered with a skin of three-ply wood. The front portion of the boat is of rectangular section, and has a step which occurs roughly under the centre of pressure of the main planes. The upper *longerons* converge towards the rear, where the upturned stern of the boat becomes triangular in section, with the apex of the triangle turned upwards. The boat is divided by bulkheads into eight watertight compartments, each fitted with a small inspection door, which allows of examination of the interior. In front the deck is extended on each side of the pointed bow of the boat to form a splashboard, while further protection is afforded the

the land machines, is, no doubt, to balance the considerable side area of the central float. The front portion of the *fuselage* is covered with aluminium, which is fitted very nicely round the engine cylinders, of which only the upper part projects outside the aluminium.

The rear part of the *fuselage* is covered in the usual way with fabric applied to the longitudinal stringers which give the *fuselage* the streamline form.

The uncovered *fuselage* shown is of a similar construction to that of the hydro., and is interesting chiefly on account of the wireless apparatus with which it is fitted. The key of the transmitter is mounted on a small table in front of the observer, and the practical demonstration of the wireless given at the Show never fails to attract a great crowd of interested onlookers, as the hissing of the sparks can be heard distinctly to the farthest corner of the Grand Palais. The wireless installation has been carried out by the Société Française Radio-Electrique. The output of the transmitter is 750 watts, and the frequency is 1,500 periods. It has a range of 200 kiloms., and the total weight is 47 kilogs.

The workmanship in the complete machine as well as in the skeleton *fuselage* is very good, although no attempt has been made to provide a highly polished "show finish."



Tail of the F.B.A. flying boat.



"Flight" Copyright.

The 100 h.p. Gnome-engined flying boat of the Franco-British Aviation Co.



pilot and passengers by a screen in front of the cockpit. The pilot's and passengers' seats are situated just in front of the leading edge of the lower main planes, the passengers' seats being formed by the petrol pressure tank. The pilot controls the machine by means of a single column on which is mounted a hand-wheel. This, however, does not rotate, but simply forms a convenient handle. A to-and-fro movement of the lever actuates the elevator, and a side-to-side movement operates the ailerons. The rudder is controlled by means of a pivoted foot-bar.

The engine is mounted on strong steel bearers just below the upper plane and drives directly the propeller, which is situated just behind the rear spar. The trailing edge of the upper plane has been cut away in the centre to provide sufficient clearance for the propeller. A petrol service tank is mounted in front of the engine just below the upper plane, and petrol is forced from the main tank to this service tank by means of a pressure-pump. The weight of the extensions of the upper main plane when the machine is at rest is taken by two tubes running from the lower extremities of the outer plane struts. Two small floats carried on a light structure of steel tubes prevents the wing tips from diving under the water should the machine heel over.

The tail planes are supported on a framework of steel tubes from the upturned rear portion of the boat. To the trailing edge of the fixed tail plane, which is of semi-circular shape, is hinged the elevator which is undivided, as the rudder is situated wholly on top of the tail plane. A small flat tail skid or plate protects the rear portion of the boat against contact with the ground.

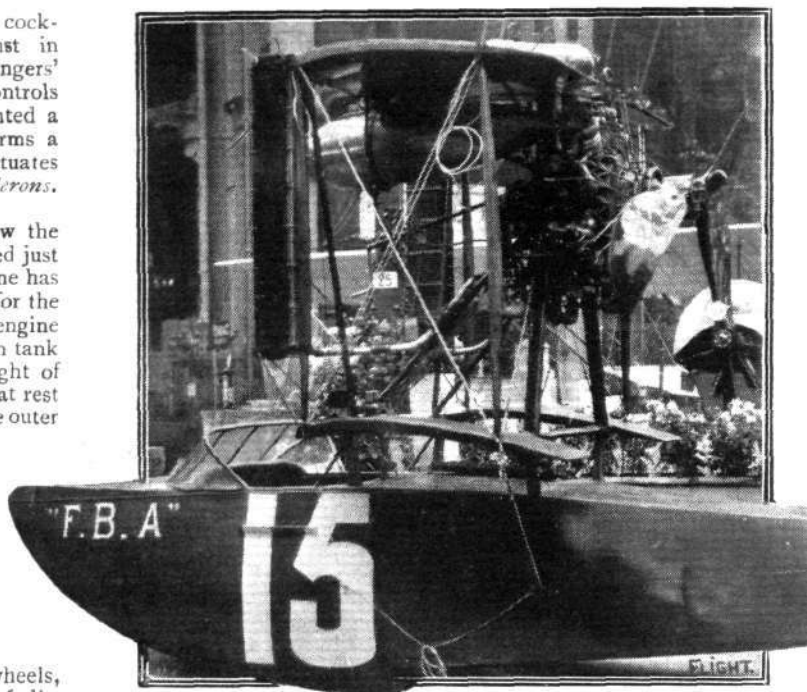
The machine shown was not actually fitted with landing wheels, but there was on the stand an exhibit of the F.B.A. system of disappearing wheels, the fitting of which would render the machine amphibious. By the F.B.A. system the pilot can raise or lower the wheels at will during flight so that starting and alighting may be effected from either land or water.

It will be interesting to watch the progress of the F.B.A. Co., Ltd., for the flying boat exhibited appears to be capable of good performances and the firm possesses a very able and experienced

## CLEMENT BAYARD.

The Clement Bayard firm are showing two machines, of which one is a high-speed single-seater monoplane, while the other is a tandem two-seater. Both machines are very much alike, and are both built of steel practically throughout.

The single-seater is driven by an 80 h.p. Gnome engine, mounted on overhung bearings, and entirely covered in by the engine cowl. The air passes in between the hemispherical shield on the propeller boss and the fixed portion of the cowl, and is allowed to escape through openings in the rear. The fuselage, which is built up of

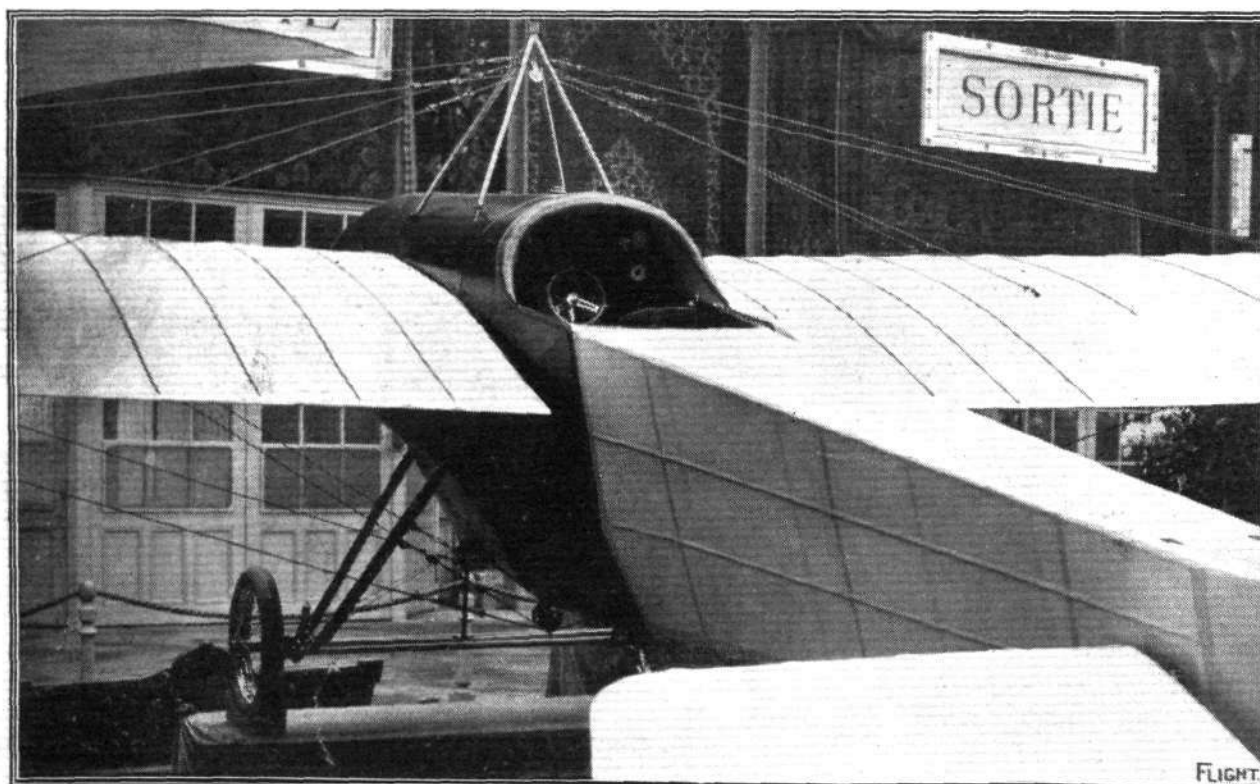


"Flight" Copyright.  
The F.B.A. flying boat—type Deauville—fitted with 130 h.p. Salmson engine.

manager and pilot in Lieut. Jean Conneau, who is better known to our readers under the name of André Beaumont, and who won the circuit of Great Britain in 1911.

steel tubes, is of pentagonal section in the front portion, while the rear part is triangular in section. On a dash in front of the pilot are mounted the various instruments, and the machine is controlled by means of a single tubular lever, which carries at its upper end a small fixed wheel, which does not rotate but simply forms a convenient handle. A to-and-fro movement of this lever operates the elevator, while the wings are warped by swinging the lever from side to side. The rudder control is effected by means of a foot-bar.

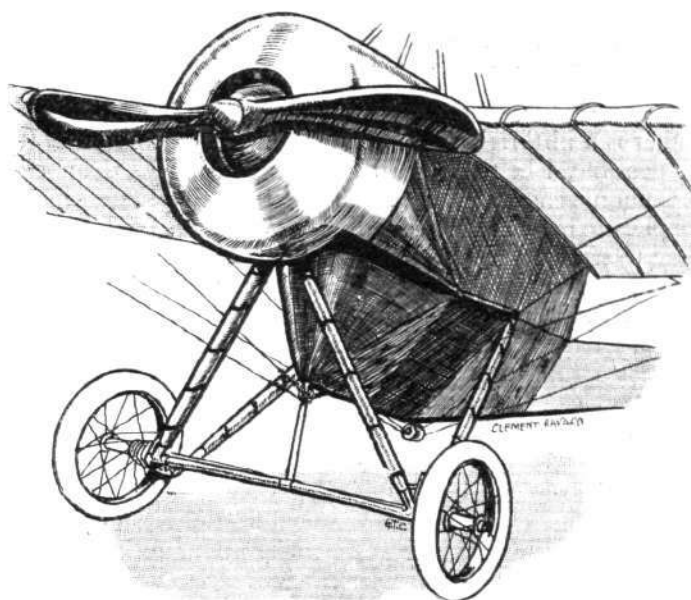
The wings, of which the trailing edge is longer than the leading



Clement-Bayard monoplane,  
1406

"Flight" Copyright.





Chassis of the Clement Bayard monoplane.

edge in order to make the warp more efficient, have been cut away near the fuselage to give the pilot a better view of the ground below. The main spars fit into sockets on the side of the fuselage, and the wings are stayed with cables running to a *cabane* on top and to the low member of the fuselage respectively, while the warp wires pass over pulleys which are also mounted on the keel of the fuselage.

The chassis, which consists of four struts of ash, connected with steel tubes, is illustrated by one of the accompanying sketches, which needs no explanation.

The tail planes of both machines are alike, and are remarkable chiefly on account of the fact that there is no fixed tail plane and that both elevator and rudder are balanced, so that the machine must be very sensitive to the controls. A very simple pivoted ash skid protects the tail planes against contact with the ground.

The two-seater machine is very similar to the single-seater, from which it differs in dimensions only. It is fitted with an 80 h.p. Clerget engine mounted on overhung bearings. The pilot's and passenger's seats are arranged in tandem, the passenger occupying the rear seat, from where he has an excellent view in all directions.

The workmanship of these machines, as is to be expected from the Clement Bayard firm, is of the very highest quality, and although the steel construction undoubtedly makes them slightly heavy, the excellent performances put up by Guillaux in his recent flights have amply demonstrated the good qualities and enormous strength under all conditions of these excellent machines.

(To be continued.)

## FLYING AT HENDON.

WITH a gusty 20-30 m.p.h. north-east wind blowing some good flying took place at the Second Winter Meeting, which was very well attended, at Hendon last Saturday. An incident that caused some excitement, and afterwards some amusement, took place early in the afternoon. The heat from a stove in Mr. Gates' office caused the adjacent woodwork to catch fire, and things began to look serious, so much so that the Hendon Fire Brigade was summoned. There were soon plenty of willing hands on the scene, however, and with the help of sand, chemical fire extinguishers, and water the flames were soon put out, and very little damage was done. Indeed, it looked more as if there had been a flood rather than a fire. Some time after the flames had been extinguished a humorous aspect was given to the incident by the arrival of the Hendon fire engine in all its glory, its entry being the cause of much cheering on the part of the Hendon *habitues*. In the meanwhile the various Hendon pilots were making exhibition and passenger flights, the Grahame-White stud being busy on the two 50 h.p. G.-W. 'buses, the M. Farman, the 80 h.p. Blériot, and the 50 h.p. Morane-Saulnier. Louis Noel was, of course, flying the M. Farman, and Marcus D. Manton, after enjoying a well-earned rest, was back again flying the twin rudder 'bus. E. Baumann made a splendid high flight on the 60 h.p. Caudron, whilst J. L. Hall also came out and made a short flight on his new 35 h.p. Caudron. Just before 3.30 p.m. a start was made for the cross-country handicap, which was flown over the usual 16-mile Bittacy Hill course (there and back four times), and produced six starters. These were L. Strange on the 50 h.p. G.-W. 'bus (11 mins. 5 secs.), Marcus D. Manton on a similar machine (8 mins.), Louis Noel on the M. Farman (4 mins. 55 secs.), E. Baumann on the 60 h.p. Caudron (4 mins. 35 secs.), W. L. Brock, with a passenger, on the 80 h.p. Blériot (15 secs.), and P. Marty on the 50 h.p. Morane-Saulnier (scratch). Noel's engine was not, apparently, doing its best, and he was overtaken by Baumann, whose little Caudron was flying very fast, on the first lap. After completing two laps Strange retired, owing to engine trouble, but the others each completed their four laps. Towards the finish the Caudron obtained the lead, and it was not until the end of the last lap that Marty overhauled him and came in first by 12 secs. Brock, however, failed to overtake the Caudron, which, therefore, came in second, 16 secs. ahead of Brock. Manton and Noel followed some time after. Whilst this race was in progress, G. L. Temple came out on his 50 h.p. Blériot, and executed some pretty spirals, finishing up with a nose dive to about 100 ft. from the ground. Immediately after the race the G.-W. machines were busy with passenger work, whilst Marty took over the 80 h.p. Blériot, and put up a fine flight. The proceedings were brought to a close in the gathering darkness by a magnificent flight by G. L. Temple. He ascended to a height of about 4,000 ft. and flew above the clouds for some time. He then executed several spirals, some of which consisted of very small circles with the machine steeply banked and hardly dropping the meanwhile. On landing he told us it was very beautiful above the clouds, which lay perfectly level below him, and the sun was shining brilliantly.

### Cross-Country Handicap. (16 miles.)

|    |  | Handicap. |         | Handicap. |
|----|--|-----------|---------|-----------|
|    |  | m. s.     | m. s.   |           |
| 1. | Philippe Marty (50 h.p. Morane-Saulnier monoplane) ... | ...       | scratch | 28 28     |
| 2. | E. Baumann (60 h.p. Caudron biplane) ...               | 4 35      |         | 28 40     |
| 3. | W. L. Brock (80 h.p. Blériot monoplane) ...            | 0 15      |         | 28 56     |
| 4. | Marcus D. Manton (50 h.p. G.-W. biplane) ...           | 8 0       |         | —         |
| 5. | Louis Noel (70 h.p. Maurice Farman biplane) ...        | 4 55      |         | —         |
| 6. | L. Strange (50 h.p. G.-W. biplane) ...                 | 11 5      |         | retired   |

### DEATH OF ROBERT SLACK.

It is with regret that we have to record the death of Robert Slack in a motor car accident on Sunday last.

Full of life and wit, with the spirits of a schoolboy, "Bobbie," as he was known to all, was one of the most popular men at the London Aerodrome, and was everybody's friend. He was rapidly becoming one of our most skilled flyers, and his experience in cross-country flying was making for him a name to be proud of.



He will perhaps be best remembered for his magnificent flight on a Morane-Saulnier monoplane from Paris to Hendon in June last against a strong head wind, when he brought over copies of the continental *Daily Mail* for the King and President Poincaré, and for his fine flying of the I.C.S. Blériot round the country. We publish deliberately a picture of him wearing a moustache, as thus he was better known, he having only comparatively recently discarded it. Poor Bobbie, we shall miss him overmuch we fear, his was a joyous nature, and it does seem a pity to lose so good a man by such a comparatively trifling accident.

# ARMCHAIR REFLECTIONS.

By THE DREAMER.

1913.

WELL, here we are, almost at the end of another year, and aviation, which was said to be a passing fad, is still with us, and growing into a strong robust child. Looking back over the year, progress does not at first sight appear to have been very great, but it is not progress that is at fault, it is memory! Things move so fast in aviation that 1912 seems years ago, and we forget things as they were then.

Machines have no doubt improved to some extent, but I think the greatest improvement has been with our pilots, who, even on the old types of machines, fly in winds and bank and spiral in a fashion they would never have dreamed of doing only twelve months ago. Last year we published a photograph of Sidney Pickles banking at an angle of about 30 degrees, and it was thought of such importance that it was reproduced in other papers almost throughout the world—without acknowledgment, mostly; Chevilliard came over this year and made our hair stand on end by banking over the vertical, and now upside-down flying is becoming so common that we hardly take the trouble to look at it; what we shall be doing in another year goodness only knows. It seems but yesterday that the great struggle between Grahame-White and Paulhan to be first to fly to Manchester was taking place; if the same prize were put up to-day, every pilot in England would jump into his machine and get there straightaway. Things seem to point at the moment to England becoming the centre of interest in aviation. There has certainly been more progress in construction in the British-built machine than in those of our cousins across the Channel, and in addition many of the foreign firms are, if not actually moving their works to England, at least about to open branch works here, and fly their machines regularly at English aerodromes, and 1914 should see many types of machines new to our eyes taking part in the weekly racing at Hendon and Brooklands. The *Daily Mail* have again been generous in providing prizes, and although we may think that this time they have made conditions rather a tall thing, I doubt very much whether they are really any more trying, taking progress into consideration, than they were for the Manchester flight; I remember then wondering if it would ever be done, and the general impression of the public was, I believe, that their money was fairly safe. I shall be greatly surprised if somebody does not scoop up both the Round Britain and American flights next year. Development along the lines of the flying-boat will, I think, be the chief line of progress for next year, and this will probably have the effect of shifting the centre of interest from London to the coast, unless something can be done to use one or other of our largest pieces of water for the purpose of testing. I should much like to see the Welsh Harp used for this purpose, though there seems to be some reason why it cannot. Taking things all round, if the progress of 1914 equals that of 1913, there will be some very startling happenings.

## Future Aerial Service with Paris.

It must be nice to be born with an imaginative brain. On second thoughts I am not quite sure whether one is born with it, or whether it is an acquisition of after-life. I have heard of people being born with or without common sense, as the case may be, so no doubt the

other is a birthright also, at any rate in the embryo. It is possible, I believe, under some circumstances, to knock common sense into one, but whether the same thing applies to imagination, I don't know. If it is so, I should like to try it, because I should like to be imaginative, and, perhaps, if I got a good smack on the head with a propeller, I might afterwards do a great deal of useful work, which experiment is, I believe, not new. People with imagination can be very entertaining and amusing, and they can imagine what things are going to be like before they mature, whilst we ordinary people have to wait and see. Even with my small amount of brain, I can conceive it as being quite possible that before very long we might have a cross-Channel fleet of airships, and that one will board one's vessel in London, and in a few hours land safely in Paris.

Captain Waterlow, in his lecture at the Royal United Service Institution recently gave a very imaginative forecast of an aerial voyage from London to Paris by one of the regular cross-Channel night services of the near future. "The train would leave Charing Cross at five o'clock." That sounds precise; but why start an aerial voyage by train? That's not much better than the old way, especially as he says the first change would be at Woolwich; surely Hyde Park is large enough to start an airship from. "Passenger weights would be registered at an automatic turnstile, and passengers over 13 st. would have to pay excess fare." Now I can see some fun here. It is bad enough to have to have one's baggage examined by the Customs officers; and although they are as a whole fairly polite, it would need a diplomat, with all the art of a French courtier of the old school, to convey to an irate dowager that she was excess luggage, so to speak; some of them are so touchy about their *avoirs*. "Rising at a slow ten miles per hour, the airship would soon come within sight of the chain of lights installed throughout Europe." To rise at ten miles an hour and call it slow, should make some of our aeroplane constructors sit up and rub their eyes. To climb at, roughly, 1,000 ft. per minute isn't bad, especially if the excess luggage department has been busy. "Mails would be taken on board at Folkestone, by means of a rope lowered from the purser's quarters." Dropping a rope for mails is pretty good in its way; it reminds me of when I used to let a cardboard box down by a piece of string from the window and pull up my sister's doll—playing cranes, I think we used to call it; and anyway, why not ship the mails in London? unless this 70 miles an hour airship is going to be beaten by a S.E. & C.R. train in a run to Folkestone. "Paris would be reached about midnight, and a descent made at 500 ft. a minute, landing as lightly as a bird." I don't think some of the ladies I spoke about just now would care to descend quite so fast—they would feel like losing some of that excess for which they had paid so dearly to bring over. There would, of course, be a dining saloon and every convenience, and I have imagination enough to imagine it would be very nice.

## Fish and Flesh.

Here are some extracts from a cutting of the *Westminster Gazette* in reference to the air voyages of Mr. Churchill and Col. Seely:—

"We think these Ministerial flights are thoroughly

ill-advised and mischievous. They serve no sort of useful object \* \* \* every branch of the service ought to run its own risks \* \* \* We hope we shall see no more of these unnecessary risks run for no useful purpose."

Here is a cutting from another paper:—

## FROM THE BRITISH FLYING GROUNDS.

### Royal Aero Club Eastchurch Flying Grounds.

ON Monday, December 15th, some fine flying was done. Lieut. Clarke-Hall was bomb-dropping from a height of 1,000 ft., but owing to high wind, a good sight for the gunner was practically impossible owing to the rolling of the machine. After dropping about nine bombs a good landing was made. Sub-Lieut. Pierce piloted the machine, which was a 80 h.p. Gnome-Short (38 type) No. 34. Sub-Lieut. Marix made a fine flight to Hendon on the Caudron 40 80 h.p. Gnome. Usual pilots doing aerodrome circuits.

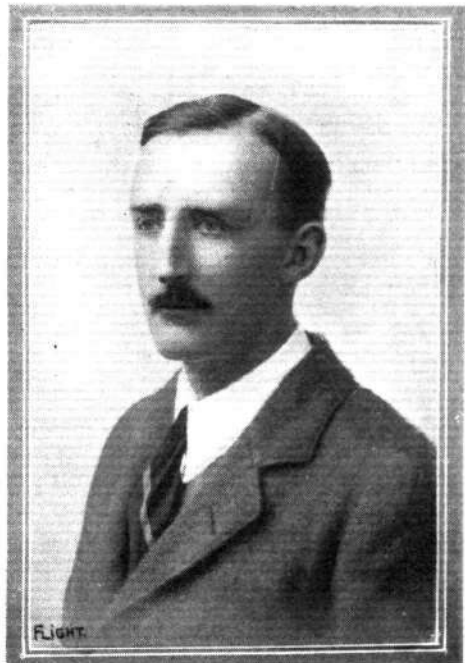
Tuesday, Sub-Lieut. Young started for height record, but owing to heavy mist had to postpone the attempt. Commander Samson fine flight on Short tractor 10 100 h.p. Gnome.

Wednesday, Sub-Lieut. Pierce piloting S. 34 with Lieut. Clarke-Hall bomb-dropping over the aerodrome with great accuracy, some of the bombs embedded in the ground at least 2 ft. In the afternoon they again went bomb-dropping over the Isle of Grain. Lieut. Clarke-Hall got one bomb right in the net from a height of 2,000 ft. As they had not returned by four o'clock p.m., Lieut. Marix went on S. 38 type 63 to search for them, but was unsuccessful. They eventually got back when the sheds had been shut down for the night. Usual pilots round grounds.

Thursday, Com. Samson on S. 3 made some extremely steep banks, followed by very small circles, with the engine running full out, and nose of the machine up, so that the machine was turning round and round on the wing tip. Sub-Lieut. Rainey also did some extraordinary good work on the 80 h.p. Bristol tractor, Sub-Lieut. Littleton was flying the Anzani-Dep. in splendid style. Darkness brought a fine day's flying to an end.

Friday, good flying again all morning by Lieut. Clarke-Hall, Asst.-Paymaster Finch Noyes, Com. Samson, but owing to heavy showers had to confine work in the hangars.

The pilots flying during the week were Com. Samson, Lieuts. Davis and Clarke-Hall, Asst.-Paymaster Finch Noyes, Capt.



Capt. M. G. Lee, who last week passed for his *brevet* tests at the Vickers School in excellent style, landing well on to the mark.

Courtney, Sub-Lieuts. Rainey, Marix, Young, Littleton, Pierce, and the machines included 10 Shorts, 2 Avros, 1 Bristol, 1 H. Farman, 1 M. Farman, 2 Deps., 1 Sopwith, 1 Caudron.

### Brooklands Aerodrome.

Bristol School.—Merriam testing on Monday, last week, afterwards taking Lieut. Bridson as passenger, and found very bumpy.

Too windy for flying on Tuesday, and blowing hard all Wednesday

"The War Office has refused to pay for a cup of cocoa for non-commissioned officers and men taking part in early-morning flights at the Central Flying School, Salisbury Plain."

"But it's thank you, Mr. Atkins, when the band begins to play."

morning. In the afternoon it became calm. Merriam then for test, afterwards with Mr. Macdonnell, who later took his certificate in a most skilful manner. Merriam afterwards gave a trip to Lieut. Hatkins (new pupil).

Vickers School.—Monday last week in morning, Barnwell on gun-carrying biplane testing gun, then with Capt. Wood as passenger.

Barnwell, Tuesday morning, on gun-carrying biplane again with passengers.

Wednesday afternoon, Barnwell on biplane No. 20 with Mr. Chataway. Capt. Dowding solo.

In morning, Thursday, Barnwell, Elsdon and Knight, on biplanes Nos. 20 and 21, tuition to Messrs. Duff, Martindale, and Liddell. Messrs. Elsdon, Waterfall and Joubert de la Ferte on No. 5 mono. Mr. R. G. Duff then for *brevet* on biplane No. 21, getting through in very fine style. In afternoon, Barnwell on gun-carrying biplane. Messrs. Knight and Barnwell on biplane No. 21, the latter with Mr. Fulton.

Friday morning, Barnwell, Knight and Elsdon on biplanes Nos. 20 and 21, instruction to Messrs. Dawson, Martindale and Fulton. Mr. Dawson solo. Barnwell with passengers on biplane No. 21.

### Eastbourne Aerodrome.

ON the 11th inst., advantage was taken of an hour or so's calm weather, when Gassler, after his usual test stunt on the E.A.C. biplane, took up Mrs. Salmon, and after two or three trips Mrs. Salmon was put in the pilot's seat, and instructed in taxiing. Mr. Thornely was out cross-country flying on the Bristol. On the 13th the weather was fair, and Gassler was out with Mrs. Salmon again, this time the lady pupil was driving and doing short straights. In the afternoon Gassler and Roberts went up in the new E.A.C. biplane, testing her capabilities. Climbing to 1,000 ft. in one circuit, and after a cross-country flight they returned, and descended from this height *en vol plané*. Mrs. Salmon again received lessons in straights.

No school work was possible after this until Thursday, the 18th, when Gassler had Mr. Gwynne up for several circuits. Mr. Thornely, who is flying remarkably well, banking and executing *vol planés* with admirable judgment, was out twice in the morning flying over the surrounding country, and again in the afternoon for a long stunt.

Friday saw the machines out shortly after daybreak, and Gassler opened the proceedings by testing the E.A.C. 'bus and notwithstanding a 30 mile wind, Mr. Thornely followed him, and climbing to well over 1,000 ft. remained almost stationary above the 'drome. Diving the machine to about 300 ft. and making a rapid circuit, he landed with a good *vol plané*.

### London Aerodrome, Collindale Avenue, Hendon.

Grahame-White School.—On Tuesday last week, Mr. Lilleywhite made circuits and figures of eight. Mr. Norris made straights with instructor. On Friday, Mr. Piercy, a new pupil, "rolling"; and on Saturday, Mr. Norris made straights with Mr. Strange, and Messrs. Webb, Lilleywhite and Cripps made circuits, Mr. Cowley, straights.

Hall School.—Monday, last week, W. A. Burn three straights on mono. Afterwards Dr. Moriarty straights, and Miss d'Elsa one straight before wind became too strong.

Burn one straight, Tuesday, but had to give up owing to strength of wind, and on Wednesday two straights, Henry Gearing two straights. J. L. Hall then flew mono. back to sheds as wind rose with considerable rapidity.

Thursday and Friday gale. New pupil, A. F. Arcier, joined school Saturday.

Sunday, J. L. Hall flying new 35 Caudron, which showed a good turn of speed and climbed exceeding well.

### Salisbury Plain.

Bristol School.—Sunday, Monday, Tuesday, Wednesday, and Thursday last week, a mixture of winds and rain and totally unfit for tuition. Friday turned out better, and the following work was done:—Voigt made a trial on a biplane, and afterwards took for tuition Capt. Fell (two flights), Lieut. Harman (two flights) and Mr. Gilligan (one flight). Excellent solos were executed by Lieut. Hallahan (three), and Mr. Garnett (2). All flights of lengthy duration. A rising wind prevented further tuition for the day.



# THE SCIENCE OF FAST FLYING.\*

By C. T. WEYMANN.

As soon as aeroplanes were able to fly, the next preoccupation of designers was to make them fly as fast as possible. In order to stimulate constructors, Mr. James Gordon-Bennett created his International Aviation Cup, destined to consecrate every year the fastest flying machine. This contest, held yearly since 1909, will give us a valuable basis to examine the lessons which aviation has been able to draw from *pure speed*.

**Reasons for Seeking Speed.**—What are the reasons which led to the pursuit of speed in aeroplanes? First, practical reasons: The faster an aeroplane could fly, the larger would be the services it could render from the point of view of communication; because, in order to be acceptable as a means of conveyance either of mails or of passengers, or even of wares, it is necessary that, for a given distance, the aeroplane should be faster than the existing modes of communication, or cheaper, to make competition possible. *Cheaper?* This question would only draw a smile to-day; *faster?* This realisation is nearer to our present times.

Besides these reasons, there are some which are directly connected with the design and the construction of aeroplanes; and these we shall now examine.

**Speed and Stability.**—In the beginnings of aviation it was thought, not without a certain reason, that *speed* would be an element of stability in the air, and often one would compare an aeroplane with a kind of cannon-ball which "remous," eddies or whirlwinds, and "air-holes" would affect very little on account of its great momentum.

I must say that, even to-day, many are of this opinion, and we all have read articles praising speed as a sort of panacea or the sole means of security in aeroplanes. Therefore we will consider, in a general way, the relation which exists between the *flight* and the *speed* of an aeroplane.

**Relation Between Speed and Flight.**—To be able to fly, an aeroplane must reach a certain speed at which its lift is equal to its weight; after which it can augment its speed if it possesses the necessary additional power, and this is what happens in practice.

Generally a machine, considered in horizontal flight, driven by its motor, possesses a certain "margin of speed"—it can fly at different speeds between a minimum and maximum. We perceive at once that this margin of speed can be independent of the absolute value of the maximum and minimum speed; in other words, we perfectly conceive a machine having a speed-range of 20 kilom. an hour—between 80 and 100 kilom. an hour for instance—and another machine having the same range between 180 and 200 kilom. an hour.

**The "No-Margin" Machine.**—A machine whose maximum and minimum speeds are so near together as to become a single speed will be what is ordinarily called a machine "*tangent*." When it is said that an aeroplane loses its flying speed, what is meant is that the speed of this machine falls below the minimum speed requisite for its flight and that its lift is inferior to its weight.

**Conditions Governing Fastest Speed.**—Let us now see under what conditions a machine may become the fastest possible. Suppose that a constructor has at his disposal only a motor of a given power. This constructor's interest is to make use of all his power solely from the point of view of speed and to take from this power just the portion actually indispensable to maintain the machine in the air. To do this, he will reduce as far as possible the head-resistance ("drag") of his machine; he will give to his *fuselage* forms having the least air resistance; he will reduce to the least needful all passive resistances such as wires, wire-strainers, struts, etc., of the landing chassis. He will do the same for the wings, their air resistance will be reduced as much as possible, keeping just the sustentation necessary for the machine to fly horizontally; for it is evident that if it did ascend, the power used in making it rise would be lost for the speed of advancement.

Now we find, in the wings with which we are acquainted so far, that the fraction showing the relation

$$\frac{K_x}{K_y} = \frac{\text{resistance to advancement}}{\text{sustentation}} = \frac{\text{drag}}{\text{lift}}$$

is the best, that is, the smallest, for only one angle of incidence and that it augments or diminishes if we augment or diminish this angle of incidence. Therefore it follows that our interest is to make a machine flying at a certain well-known angle in order to have the best utilisation of the power available.

**Result of Fastest Speed.**—As this angle is definite, the weight of the machine being also definite it follows that, for a certain speed, the area of the supporting surface is also definite—that is to say—if this surface is exactly what it must be, our aeroplane, having reached this certain speed on the ground (supposed to be perfectly

even) will fly in indifferent equilibrium, or balance, without rising or descending, at the maximum speed which its resistance to advancement and the power of the motor will allow. It follows that this aeroplane will be the fastest which, in the present state of this science, can possibly be built with a given motor; but this aeroplane will be a machine without margin of speed, i.e., "*tangent*."

We find an immediate confirmation of what precedes, in considering what happened in the Gordon-Bennett contests.

Having finished a machine with a certain *fuselage* and a certain motor, constructors have always designed wings larger than was absolutely necessary, and this is easily understood on account of the almost insuperable difficulties of steering which, if built to the limiting condition, a machine would present. It follows that these machines flew under angles smaller than the "optimum" angle, and their head-resistance notably increased; from this fact they flew less fast than they could have done with smaller wings; and we have seen Blériot in 1909, Leblanc and Hamel at Eastchurch, cut their wings at the last moment, and gain in this way a few kilometres of speed. Therefore, the pursuit of *pure speed* in aeroplanes leads to the pursuit of a machine whose head-resistance is the smallest possible, and whose lift is the least possible superior to the weight of the machine—which means a machine "*tangent*" and consequently *dangerous*.

**Dangers of "No-Margin" Machines.**—Such machines are dangerous, for two reasons. First, by the fact that on the ground, while rolling, a "no-margin" machine reaches as much as possible its maximum speed, and consequently the landing is made at a sensibly similar speed. This is not without inconvenience when the ground is not perfectly even, and the pilot not sufficiently skilful to alight delicately, without his machine having any appreciable vertical speed at the moment of touching the ground.

The difficulties of starting, and chiefly of landing, have been so often the subject of many discussions that we need not devote much time to them here.

**Rolling.**—Everybody, in fact, can understand the difficulty of steering on the ground an instrument weighing 500 kil. rolling on two wheels, at a speed of 130 or 150 kil. an hour, without brakes and with a steering whose sensibility diminishes in proportion to the decrease of speed, so that, at about 60 or 80 kil. an hour, the machine goes exactly where it pleases—and then, if the pilot has not given it a strictly rectilinear direction when he could have done so, he has all chances to make a turn about on himself, which, I can assure you, offers very limited charms! Needless to say that at such speeds it is impossible, without turning over, to try the least curve on the ground to avoid any obstacle.

But there is another cause of danger even as serious, if not more; it concerns the flying qualities of the machine.

**In the Air.**—We have seen that to fly the fastest possible, the machine must be "*tangent*." In consequence, this machine is at the very mercy of the least weakening of the engine, and "remous" can bring it into serious danger. In fact, when the motor weakens, the speed diminishes; to keep up the speed and keep control of the machine, the pilot must steer it downwards, "dive", and land as soon as he can. If the motor stops entirely, one must immediately dive steeply in order to keep up the speed of the machine. All these manoeuvres must be made rapidly, and the least inattention may lead to a catastrophe.

**A Practical Example.**—The Gordon-Bennett contest of 1911,† run in England, at Eastchurch, affords striking evidence of this. The English competitor, Hamel, having cut his wings in order to fly faster, and having, in fact, gained speed, found himself at a turn rounding a pylon, having lost a little of his speed and being rather near the ground. The aeroplane not being fully sustained, the pilot could not prevent it falling suddenly and coming into brutal contact with the ground. What might have been a fearful catastrophe was avoided, thanks to lucky circumstances. By the shock Hamel was projected forward, without touching any part of the machine, and he escaped with painful but not dangerous bruises. This machine, being "*tangent*," had no excess of power.

**Effect of Gusts.**—And this shows that we must not believe that *speed, pure and simple*, the maximum speed of the machine, is an element of stability. This is easily understood. If we take, for example, our extra fast and "no-margin" machine, it is certain that this machine will defend itself with difficulty against gusts of wind. For, to defend himself against, for instance, a lateral inclination, what has the pilot to do? He must warp, or augment, the incidence of the wing which is lowering, and diminish the incidence of the wing which is rising. Now, in the case under consideration, these two

† Won by the Author on a Nieuport monoplane at a mean speed of 78 miles an hour.

\* Paper read before Aeronautical Society of Great Britain on December 17th, 1913, at the Royal United Service Institution, Whitehall, S.W.

manœuvres have for effect to augment the relation  $\frac{K_x}{K_y}$ , drag, lift, therefore requiring a larger power than that which we have available. The speed, and consequently the lift, diminishes, the machine will not obey, and will accentuate its lateral movement.

The same for the "elevator"; the only possible effect of moving it up or down is to make the machine "dive"; one cannot make it rise. The belief that a fast machine obeys better than a slow one comes solely from the fact that the machines of the Gordon-Bennett contests, with a few exceptions, were not quite "tangent," because, for practical reasons, their constructors could not reach that limit. These machines obeyed often better than ordinary aeroplanes, because they were simply "stock" machines fitted with a more powerful motor than ordinarily. The fast machine is as sensible to whirlwinds as the slow machine; but its momentum being greater, the shocks it receives are more violent but less prolonged.

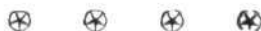
*Speed should come after Safety.*—The progress in aeroplanes due to the Gordon-Bennett Cup is a progress in the construction, in the utilisation of materials and principally in the shapes of least head-resistance. But it can be well said that, to-day, the pursuit of *pure speed* is an antiquated formula because it is too incomplete. What, at present, must be looked for is an excess of power, which alone furnishes the necessary means of defence against "remous" and against the wind. Only after this comes speed, on the single ground of utility, so that the machine may in practice be able to fly in any direction, without too much interference by the wind, with its range of action or with its speed. To-day, now that aeroplanes have reached such improvements, there is too large a difference between a machine specially constructed for speed and an ordinary practical machine, to permit of the maintenance of the former old formula.

While we do homage to the different Gordon-Bennett Cup contests that have taught us not to fear speed, let us, while striving to fly very fast, the fastest we can, always keep in view the object of effective practical results and positive possibilities.

In the subsequent discussion, Mr. A. R. Low pointed out that

the rapid progress made in aeronautics in France was largely due to the remarkable succession of both theoretical and practical men, and said that the Germans, with their painstaking care of details, were not far behind them. Hence, he thought it behoved us to foster the development of both theory and practice as being most likely to produce the most efficient results, and paid tribute to the high standard of work carried out at the National Physical Laboratory. He then proceeded to explain more fully what is meant by the "tangent" machine by the aid of a blackboard diagram. Mr. Hucks remarked that he had little to say on the question of pure speed, but as regards looping the loop and upside-down flying he compared the performances of Hamel on the Morane-Saulnier and those he had made on his Blériot to the ponderous movements of a piece of cardboard let fall from the hand and the quicker evolutions performed by a sheet of paper. He said that he was essentially a practical man and all he had done he had had to find out by practice, but he would be glad to know what distance he would have to dive on a Blériot before the attainment of his maximum speed, that is when the increase in the resistance prevented any further increase in speed, and how this would compare with that necessary on a Morane-Saulnier. This was discussed by Mr. Low and Mr. Handley Page, and then Mr. Gordon Bell observed that there were two lines along which progress in high speed was now being made, namely, by the development of machines of the Gordon-Bennett type and by the production of machines such as the Avro and the Sopwith, and he thought that the latter was the right course to pursue. But Mr. Griffith Brewer pointed out that under the new rules for the Gordon-Bennett Cup it would be first necessary for a machine to show itself capable of flying at a speed of not more than 70 kiloms. per hour, before it would be allowed to enter the pure speed contest—thus they would obtain that flexibility which was so desirable.

Mr. T. W. K. Clarke referred to the influence of speed on the wing surface necessary to carry the load, and indicated the rapid increase of power required to propel aircraft at higher speeds than those at present employed.



THE REMAINS OF WORTHING PIER AS SEEN FROM AN AEROPLANE.—It will be remembered that this pier was wrecked towards the end of last year, leaving the pavilion stranded, cut off by the sea, as seen in the photograph.



# BRITISH NOTES OF THE WEEK.

## ROYAL FLYING CORPS (MILITARY WING).

WAR OFFICE summary of work for week ending December 13th :—

**No. 1 Squadron.**—The "Delta" was out on reconnaissance by day on Monday and by night on Thursday.

**No. 2 Squadron.**—The flights carried out short reconnaissance flights during the week. Two of the sheds are now erected in the new aerodrome.

**No. 3 Squadron.**—Machines were out each day of the week, with a total of 8½ hours. Capt. Herbert and Lieut. Stopford flew to Hythe.

**No. 4 Squadron.**—Machines were out nearly every day of the week piloted by officers and warrant officers of the squadron. A total of 763 miles was flown during the week.

**No. 5 Squadron.**—Cross-country flights were carried out on the 7th and 8th, and instructional flying took place on the other days of the week; a total of 965 air miles being flown. Lieuts. Anderson and Gill flew back from Dover.

**Flying Depot.**—The usual experimental and repair work was performed during the week.

## Naval Air Station at Devonport.

It is practically certain that early in the new year a naval air station will be established at Devonport, and although at first the equipment will consist of seaplanes and aeroplanes, it is believed that an airship will be stationed there as soon as one is available.

## The Isle of Grain Air Station.

THE Coastguards at the Isle of Grain having been transferred to Cliffe at Hoo, a few miles further up the Thames, their quarters,

which consist of thirteen houses are to be utilized for the accommodation of officers and men attached to the Isle of Grain Air Station.

## Col. Seely at the Helm.

DURING a visit to Farnborough on Friday last week, Col. Seely, Secretary of State for War, went up on a biplane piloted by Mr. Wingfield Smith, and it was stated subsequently that during a part of the trip, which was of about 15 mins. duration, Col. Seely manipulated the controls.

## An R.F.C. Appointment.

It is announced that Capt. R. K. Bagnall Wild, R.E., who some time ago was Secretary to the War Office Mechanical Transport Committee, and subsequently left the Army and was engaged in the heavy vehicle industry, has been appointed to the Royal Flying Corps as Inspector of Motors.

## Guns for Fighting Aircraft.

It is understood that the tests which have been made during the past few weeks at the Needles Battery in the Isle of Wight, with a new gun produced by the War Office especially for fighting aircraft, have yielded satisfactory results. The range of the new weapon is said to be such that projectiles will reach an altitude beyond that at which aviators can ordinarily fly, and the knowledge of the possibility of this gun being used against them would cause aerial scouts to keep to such a height that they would be unable to obtain accurate details of the works over which they might fly.

## Mr. Hucks at Shoreham.

LAST Saturday and Sunday were red letter days at the Brighton-Shoreham aerodrome, Mr. Hucks giving very fine exhibitions on both days. On Saturday he flew up-side down for several seconds, and made eight loops, including a double one. On the following day he made a trip to Brighton in the morning and looped the loop again in the afternoon. On both days Mr. Cecil Pashley made flights on his H. Farman biplane with Mr. Clarence Winchester.

## Flying at Combermere.

LAST week some good flying was seen at Combermere Abbey, Cheshire, among the pilots being Lord Edward Grosvenor and Mr. Gustav Hamel on Blériot machines and Capt. Maitland. The notable people taken up by Mr. Gustav Hamel included Lady Helen Grosvenor and Lady Dorothy Browne.

## Chanteloup to Fly at Hendon During Christmas Holidays.

LONDONERS are to have an opportunity of seeing more wonderful demonstrations of upside-down flying and "looping the loop" at the Hendon Aerodrome during the Christmas holidays. Arrangements have now been made for Chanteloup, who was the first man to "loop the loop" on a biplane, to give demonstrations on Boxing Day, December 26th, and Saturday, December 27th, at 11.30 a.m. and 3.30 p.m. each day, weather permitting, of course. We understand that M. Chanteloup's exhibition includes a remarkable descent while in an inverted position, during which he descends vertically with his Caudron biplane quite horizontal.

## M. Salmét to Go to Nice.

ARRANGEMENTS have been made with M. Salmét to carry parcels of the *Daily Mail* Riviera Supplement on alternate days from Nice to San Remo, and from Nice to St. Raphael and Hyeres. M. Salmét will use an 80 h.p. Gnome-Blériot, and will take up passengers during the morning and evening. As M. Salmét passes the various towns *en route*, he will throw out a small parcel of papers attached to a parachute, which will carry them to the ground, where they will be taken charge of by men who will be waiting to distribute the papers.



## AERONAUTICAL SOCIETY OF GREAT BRITAIN.

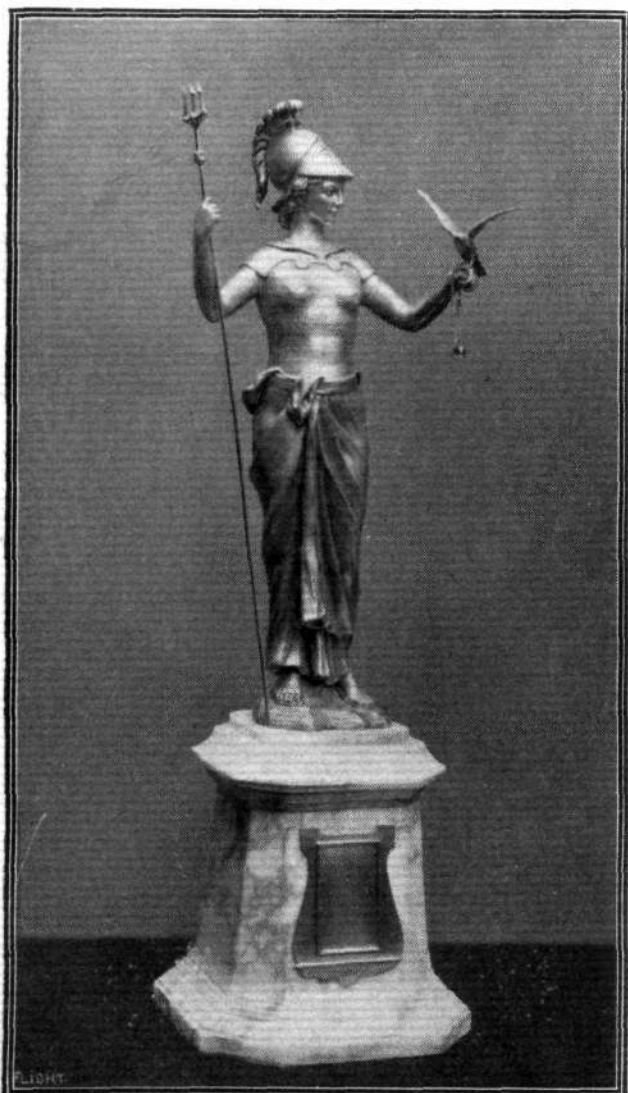
### Official Notices.

**Elections.**—Members: J. L. Lake and Hartley B. Pratt. Associate-Members: Lieut. G. J. Malcolm, R.F.A. and Hon. H. Lyttelton Pelham. Student: G. T. Roland Hill.

**Meeting.**—The fourth meeting of the forty-ninth session will be held on Wednesday, January 7th, at 8.30 p.m. Maj.-Gen. R. M. Ruck, C.B., will preside. Dr. W. N. Shaw, F.R.S., will read a paper on "Wind Gusts and the Structure of Aerial Disturbances." The Royal Meteorological Society will be the guests of the Society on this occasion, and the above paper will be followed by a joint discussion.

Tickets for visitors may be obtained from the Secretary, 11, Adam Street, Adelphi.

BERTRAM G. COOPER, Secretary.



The Britannia Challenge Trophy presented to the Royal Aero Club by Mr. H. Barber. This trophy will be awarded by the Royal Aero Club to the British aviator who, in the opinion of the Committee, shall have accomplished the most meritorious performance in the air during 1913.



## FOREIGN AVIATION NEWS.

**Renaux Crosses the Channel.**

ON the Maurice Farman biplane built for the Admiralty sea-plane, which he has been testing at Boulogne for a few days, Renaux, accompanied by his mechanic, on the 18th inst., flew across the Channel, and following the East Coast alighted at Felixstowe.

**French Lecture on British Military Aviation.**

ON Thursday week, a paper was read before the Société Française de Navigation Aérienne by Naval Ensign Delaunay, the subject being English Military Aviation, and the lecture was illustrated by numerous lantern slides. The lecturer recently spent some considerable time over here.

**An Ambassador in the Air.**

AMONG the visitors to Buc on the 13th was Mr. Herrick, the U.S. Ambassador, and he enjoyed a trip on a Blériot with Bidot. A number of members of the French Senate were present, and also witnessed flights by Senator Raymond.

**Mr. Churchill at Buc.**

ON Friday of last week Mr. Winston Churchill, First Lord of the Admiralty, accompanied by several naval officers, paid a visit to Buc. He saw over forty machines on the ground, and most of them were seen in the air during the afternoon. Over a score of Farman machines were ranged up in line, and several of the visitors were taken up. Chevilliard gave a fine display of up-side down flying, side dives, &c.

**Lacrouze Going South.**

ON his 80 h.p. Gnome-Blériot tandem machine, accompanied by M. Parent, Lacrouze arrived at Lyon on the 13th from Avranches, having made one stop on the way at Macon. He intends to continue his journey to Nice.

**Garros Loops the Loop.**

By way of practice before sending his new Morane-Saulnier to the South of France, where he is booked to give a series of exhibitions, Roland Garros was testing it at Villacoublay on the 8th. His first attempt at looping-the-loop was not quite successful, the machine side-slipping just before the finish, but in a subsequent attempt he made two loops in succession. He also made a fine Z dive and some very steeply banked turns.

On the 18th inst., at Frejus, Garros went up to a height of a thousand metres, and then landed by a very fine spiral. He intends shortly to make another attempt on the height record.

**A New Biplane Looper.**

AT Bolbec (Seine-Inferieure), on the 10th inst., Poiree gave an extraordinary display of looping the loop, figure eights, and the *chute de cote*, on a Henry Farman machine. The flights were witnessed by a crowd of about 10,000 persons.

**Testing the Morane "Parasol."**

AT Villacoublay on the 8th inst. some tests were carried out by Gilbert with one of the Morane machines with the main planes arranged some distance above the fuselage. The tests were watched by representatives of the French and Russian armies. With an 80 h.p. 9-cyl. Rhone motor the machine is said to have attained a speed of 120 k.p.h.

**Marc Pourpe in Egypt.**

HAVING made arrangements to fly from Cairo to Khartoum on the Morane machine on which Garros crossed the Mediterranean, Marc Pourpe started from Heliopolis on the 11th inst. He had, however, proceeded but a short distance when, probably through being caught in a *remous*, the machine dived to the ground, and was considerably damaged, the pilot however, escaping unhurt.

**A New Monoplane.**

AT Juvisy, on the 7th, a new monoplane built by de Brageas made its appearance, and with Bobba as pilot, made a flight of about a quarter of an hour's duration over the neighbourhood of the aerodrome. The new monoplane has the motor and propeller arranged at the back of the main plane, the motor being a 80 h.p. Canton-Unne.

**Testing a Clerget-Farman.**

AT Mourmelon, on the 17th inst., Testulat on a Henry Farman biplane, fitted with a 80 h.p. Clerget-Blin, climbed 1,000 metres in 12½ mins., the machine carrying a useful load of 300 kilogs.

**Prize for Paris-Bucharest Flight.**

PRINCE VALENTINE BIBESCO, who has done a good deal to push forward aviation in Roumania, has offered to the Roumanian Aero Club a cup to be awarded for a race between Paris and Bucharest.

**New Farman Military Pilots.**

ON the 10th inst., Rene Germain completed his qualifying flights for his military certificate by a very fine flight from Etampes

to Mailly Camp and back on a Gnome-Farman. On the 12th inst., Beard arrived at Amberieu from Dijon and Beaune, having flown 200 kiloms. in 1 hour 40 mins.

**Hanouille at Marseilles.**

ON Sunday week and Monday, Hanouille gave several looping-the-loop flights on his Blériot machine at Marseilles. He varied his exhibition with some very impressive spiral descents and *glissades sur une aile*, which were enthusiastically applauded by the large crowd which was attracted to the Borely Park, which was utilised as an aerodrome.

**Bill Joins the Loopers.**

ANOTHER exponent of looping-the-loop on the Farman biplane is Bill, who on Saturday week at Buc made one short flight upside down, and on Sunday he did it twice and also made circles with the planes of his machine vertical and a *chute de cote*.

**Chevilliard at Brussels, &c.**

ON the 10th inst., Chevilliard was in Belgium and gave a fine display of looping-the-loop, &c., on his Farman machine, before a large crowd at the Berchem Aerodrome, near Brussels. On the 15th he gave a similar exhibition at Lausanne.

**Chanteloup also Visits Belgium.**

IN very high winds Chanteloup gave a looping-the-loop exhibition, &c., on his Caudron machine at Laeken, in Belgium, on the 14th inst. He was also flying at the same place on the following day, in one 10 mins. flight making six successive loops, and flying for several seconds with the machine upside down. Last week-end he was at Copenhagen, and, as mentioned elsewhere, he will be at Hendon on Boxing Day.

**Motor Competition in Germany.**

THE new competition for a prize of £5,600 offered by the Kaiser for aeroplane motors, will be open to engines ranging from 80 to 200 h.p., and the weight must not be more than 4 kilogs. per h.p. After undergoing eliminating trials, the successful motors will have to make a 60 hours' endurance test, during which two stops not exceeding five hours each time may be made for replenishment of petrol and oil. The only repairs which may be made during the trial are such as would be made by a pilot in the course of a voyage on an aeroplane with the aid of the passenger, and utilising spare parts carried on board.

**Flying Prohibited at Cologne.**

TWO flying schools and works at Cologne have had to close owing to a notification from the Governor that the regulations prohibiting flying over or near fortifications are to be strictly enforced. One firm has migrated to Hangelar, near Bonn, while the other has started a works at Siegburg.

**With a Hydro Over the Apennines.**

CEVASCO, on a hydro-aeroplane, on the 14th inst. flew from Sesto-Calende, on Lake Maggiore, to Genoa, the trip of 165 kiloms. taking 1 hr. 25 mins., and the Apennines being crossed at a height of 2,000 metres. Cevasco intends to go on to Monaco, and then, returning to Genoa, fly across Italy to Rome and on to Cettinje, where he will deliver a letter from the King of Italy to the King of Montenegro.

**A Long Flight in Italy.**

ON the 15th inst., Capt. E. La Polla completed a flight of 1,100 kiloms. on his Farman biplane, the itinerary of the trip included Pordenone, Pesaro, Foggia, Naples, and Rome.

**An Aeroplane Race at Brescia.**

IN connection with the motor car race which is to be held on the Brescia Circuit on September 6th and 7th, next year, it is proposed to have a race for aeroplanes. The suggestion is that as each car is started the aeroplane bearing the same number should also be sent on its way.

**Vedrine's at Constantinople.**

ON the 16th inst. Vedrine's made a flight over Constantinople on his Blériot. He dropped a Turkish flag on to the Sultan's palace and a French flag on to the cruiser "Jeanne Blanche" in the harbour. Bonnier, who is also at Constantinople, and Vedrine's have decided to continue their flight to Asia Minor in company, "for the glory of their country."

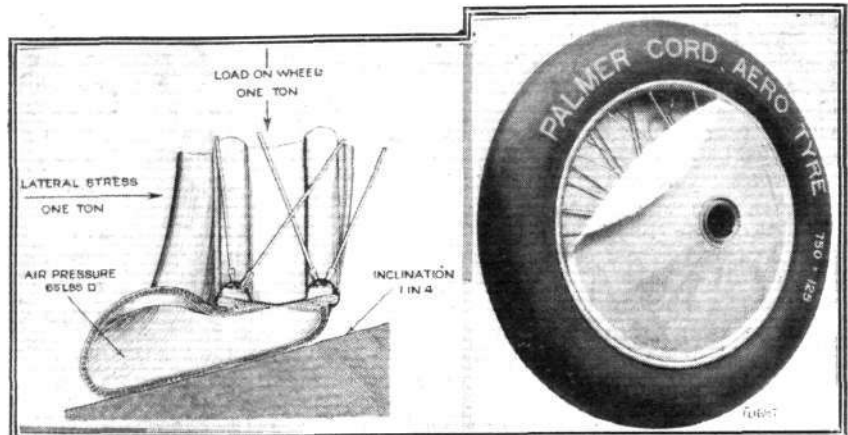
**The Wright Automatic Stability Machine.**

AT the banquet given by the Aero Club of America on the 17th inst., Mr. Orville Wright referred to the latest developments of the Automatic Stability device and he is reported to have stated that he has found that the machine fitted with the attachment which has been flying practically daily for the last four months is as easy to control as a motor car.

## THE PALMER CORD AERO TYRE.

AMONG what might be termed the accessory exhibits at the Paris Show there was one which was interesting not only from the fact that it was British but also because of its ingenious features. We refer to the special Palmer cord tyre for use on aeroplanes, and which has been designed to withstand the severe lateral strain to which such tyres are subjected. It has been found that the ordinary beaded edge tyres as used on cycles and motor cycles give trouble when used for aeroplanes because, when landing with a side wind blowing, the lateral stress set up in the tyres causes the "toe" of the tyre bead to lift, which allows the air tube to blow underneath and burst, or in some cases the tyre is pulled bodily off the rim. To overcome this difficulty, a rim of special design is used for the Palmer Aero Tyre, and the beads of the cover are so constructed that they lock in the rim, as is shown in the section. This section shows clearly what takes place when the tyre is subjected to a very severe side strain. Naturally the cord fabric is used in the construction of the cover, and it is claimed that, by its use, strength for strength, the Palmer Aero Tyre is much lighter than those made from other materials. The Palmer Co. are also selling a very useful disc for covering the spokes of the wheels. These discs are light in

weight and can be very quickly attached to or detached from the wheel as they are fitted with a number of spring hooks which engage with holes drilled in the side of the wheel rim.



Cross section of a Palmer Aero Tyre under test and a general view of tyre on wheel fitted also with Palmer side covers.



## AIRSHIP NEWS.

### The New Forlanini Airship.

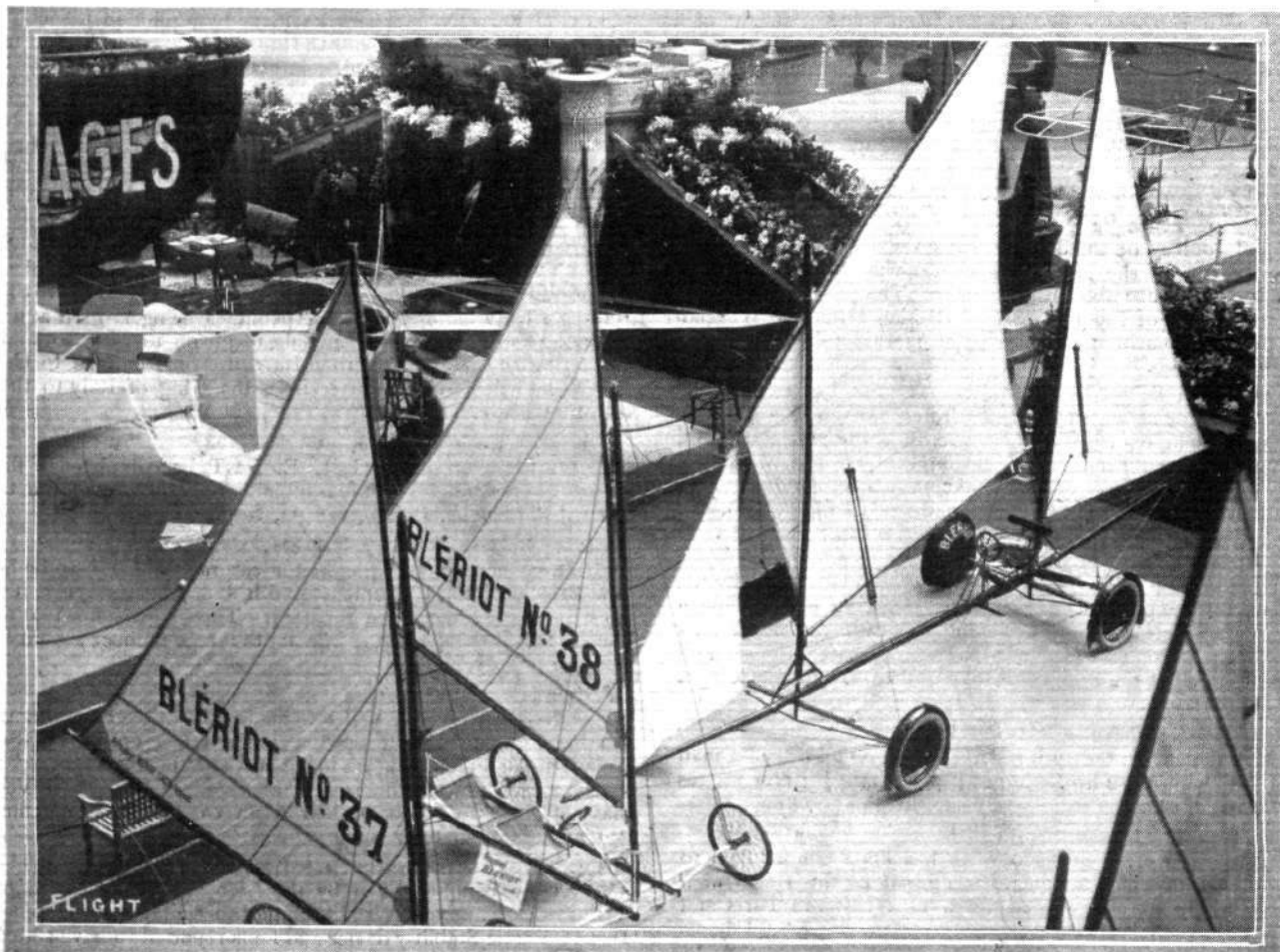
THE "Citta di Milano," the latest airship built by Forlanini, made a trial trip across Lake Maggiore on the 11th inst. It carried seven persons and went up to a height of 2,000 metres during the run from Baggio to Arona. The return journey was made *via* Varese and Gallarate. Altogether the dirigible was in the air for 2½ hours.

### The "Spiess" Airship on Trial.

FRANCE'S rigid airship, the "Spiess," made another appearance on the 11th inst, when it cruised for two hours over Versailles, Chaville and St. Cyr, and then had to return to the shelter of its hangar on account of rain. Six passengers were on board.

### More Zeppelins for German Government.

IN addition to the five Zeppelins, of which two are for the Army and one for the Navy, now being built at Friedrichshafen, it is stated that the construction of two more for the Army will shortly be commenced in new works at Potsdam.



A trio of Blériot aeroplanes at the Paris Salon.

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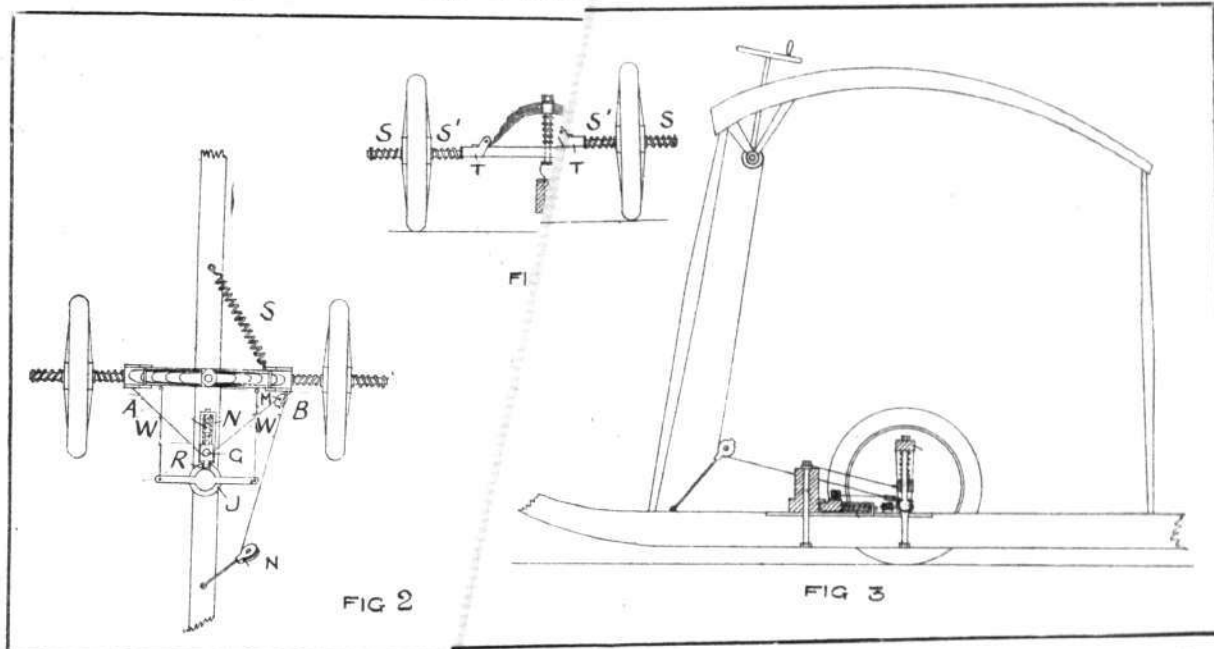


Edited by V. E. HANSON, M.A.

### Landing and Steering Chassis for Aerial Machines.

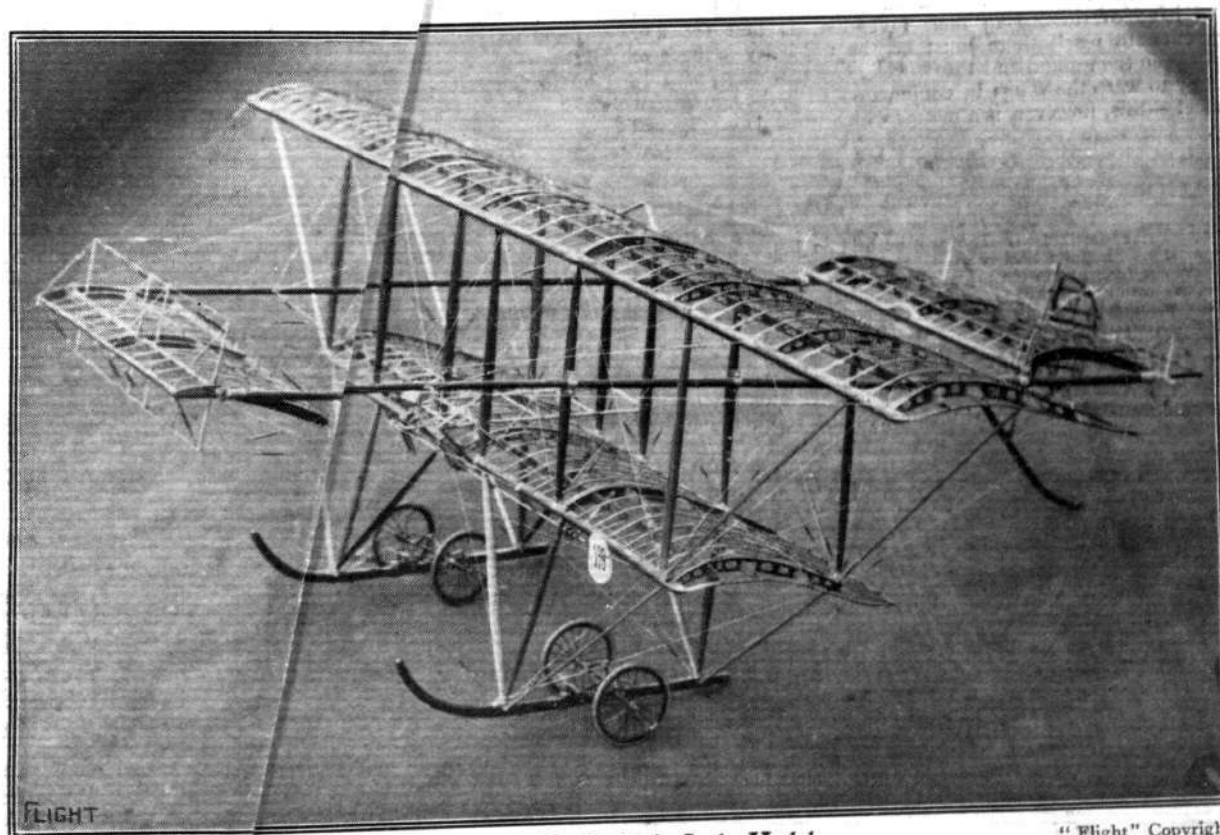
ONE of the most interesting models exhibited at the last Royal Aero Club Show at Olympia was that of Mr. H. H. Ridley, of which we publish this week some particulars and illustrations. As can clearly be seen from the photograph, the model, which shows great detail, was a beautiful piece of workmanship. Moreover

more or less difficulty must be experienced in steering the machine when the speed is slow. In this invention means are provided whereby the axles of the steering-wheels are firmly held in their normal position, but can readily be released when it is desired to turn them for steering purposes. Means are provided for the employment of only one controlling device for effecting both the



was a model (i.e., a scale and not a flying model) which had a definite idea behind it, for the machine was nothing more nor less than a working model of an invention or design for providing a more efficient means of steering a full-sized machine over ground than that provided by means of the tail alone, since in a tail alone

securing and releasing of the wheels. Two steering axles, one on each side of the machine so arranged as to turn independently, one for steering in each direction, both axles being operated by the same controlling means, are also included in the design, which also provides means for absorbing shocks on landing,



Mr. H. H. Ridley's Scale Model.  
1415

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and for enabling the wheels to run over obstructions or inequalities in the ground, without displacing any part of the machine, other than the axle, one of the main ideas in the design being to provide such means as shall enable the machine to make a complete turning movement in a very limited area, and so obviate accidents on landing. Fig. 1 shows one of the pairs of pneumatic tyred wheels, attached to the axle, with the intervening springs, S and S', to absorb the shock and allow of the necessary lateral movement. The axle is pivoted centrally through the skid, K, and suitably mounted over a ball joint, B, to permit of the movement of the axle in all directions necessitated by irregularities, &c., of the ground.

Fig. 2 shows how one controlling wire leads from the outside end of the axle, passing thence round the roller, G, secured in a locking nut, N. This last named is firmly secured to the skid, which receives the casing for the roller and terminates in a base running parallel to the skid, and so arranged at its forward end as to fit in a small recess, R, in a capstan, J, and connected to the axle by wires or cords, W, a suitable spring being mounted in the slot behind the locking bolt, so as to normally hold the bolt in position and prevent the capstan turning. The wire, after passing through the roller just described, travels along to the pulley block, M, and thence to N, from which it passes to a small drum connected by means of suitable gearing to the handwheel, in such a position as to be conveniently operated by the pilot, Fig. 3. The action of the mechanism is as follows: The turning of the lever or hand wheel brings pressure upon the locking bolt by means of the connecting wires, and draws the bolt from its recess. Continued turning of the wheel operating the movement until the necessary movement is obtained. Reversing the direction of rotation allows of the unwinding of the controlling wire and the return of the axle to its normal horizontal position, such action being assisted by the action of the spring, S, Fig. 2. As soon as the axle reaches its normal position, the pressure on the locking bolt provided by the coil spring causes it to resume its place in the recess as before. Further turning of the wheel then commences to turn the opposite and similar pair of wheels in exactly a similar manner, the slack wire being merely unwound from the drum. There are, of course, two drums, one connected with each pair of wheels. Whilst one drum is being wound the other is unwound. Each pair of wheels can turn in an outward direction only, and whichever pair is in operation the axle of the opposite pair remains normally horizontal, and at right-angles to the skid; the partially rotated wheels serving as a pivot on which the machine can turn. Obviously a little consideration will show that by operating one pair of wheels at a time, the machine can turn round in a smaller space.

Should the machine descend so as to touch the ground not on an even keel, that is to say so that one pair of wheels touch the ground before the other, the axle on that side will at once swivel on its ball joint, so that both wheels are brought into contact with the ground.

One point that Mr. Ridley and his collaborator, Mr. H. J. White, appear to have overlooked in their invention, is that for any pivoting action to result there must be the necessary amount of friction between the ground and the wheels, and it would probably be necessary to warp the wings in conjunction with the movement of the wheels—this, however, is a matter which presents no especial difficulty.



## KITE AND MODEL AEROPLANE ASSOCIATION

### Official Notices.

Lecture and Prize Distribution.—This will be held on Jan. 9th, at Caxton Hall, Westminster. Sir John Shelley will take the chair at 7.30. All members who are Model Engineer prize winners are asked to be present to receive same. The lecture, as announced, will be given by F. Handley Page, Esq., A.F.A.E.S.

Any reader wishing to attend should send stamped envelope to the hon. sec. 27, Victory Road, Wimbledon. W. H. AKEHURST, Hon. Sec

## AFFILIATED MODEL CLUBS DIARY.

CLUB reports of chief work done will be published monthly for the future. Secretaries' reports, to be included, must reach the Editor on the last Monday in each month.

Leytonstone and District Aero Club (64, LEYSPRING ROAD).

DEC. 28TH, at 10 a.m., flying on Wanstead Flats; if wet, meet at clubroom. Reigate, Redhill and District (THE COTTAGE, WOODLANDS AVENUE, REDHILL).

DEC. 27TH, Ransom Cup competition, 3 p.m., Earlswood Common.

Wimbledon and District (165, HOLLAND ROAD, W.).

DEC. 27TH, contest with Paddington Aero Club on Wimbledon Common, at 2.30 p.m. sharp. DEC. 28TH, at 11.30 a.m., sweepstake for duration, r.o.g., entrance fee, 6d., to be paid on the ground.

## UNAFFILIATED CLUBS.

Finsbury and District (85, UPPER TOLLINGTON PARK, N.).

DEC. 26TH (Boxing Day) and 27th, flying, Finsbury Park.

S. Eastern Model A.C. (1, RAILWAY APPROACH, BROCKLEY).

DEC. 27TH, flying, Woolwich Common, 3.30 p.m. until dusk. DEC. 28TH, Blackheath, 7.30 to 10 a.m. During the Christmas holidays flying will take place at the Woolwich and Lee aerodromes. Final particulars of the exhibition and of next year's trophy competitions will appear next week.

## CORRESPONDENCE.

### French Constructors.

[1817] In your issue of the 13th inst., I think the remarks in your leading article on the Aero Show in Paris are somewhat uncalled for, and certainly should not tend to encourage the aeroplane industry in this country. I do not, of course, nor could anybody else in reading the article, know what you mean by "small firms," but the French Government, so far from discouraging the aeroplane industry are placing very large orders. Farman Brothers are, for instance, considerably more than doubling their already very large works. I do not know whether you have made enquiries or not, as to whom the orders are going, but I think anyone reading your article would think that the orders for aeroplanes were going to big armament firms.

p.p. THE AIRCRAFT COMPANY,

December 17th.

G. H. T.

[In referring to "small constructors" we can hardly conceive that any reader would assume such firms as Messrs. Farman Frères, Blériot, &c., were intended. Several firms of this rank have been making, and will surely continue to make, history, and in regard to orders are more likely to receive increased Government support than the reverse. Moreover, with regard to constructors of special machines, they will have equal possibilities of being amongst the "absorbing concerns" of the time.—ED.]



### U.S.A. Government and Aviation.

It would seem that at last the U.S. Government is taking a more serious view of aviation, as, according to a note from New York, it is proposed that a party of members of the Congress should visit Europe in order to investigate the progress of military aviation in various countries.

### A Paper Knife for the Asking.

A PAPER knife is always useful and it is by no means less acceptable when it can be had free. Messrs. Charles Clifford and Son, Ltd., Fazeley Street Mills, Birmingham, are anxious to make readers of FLIGHT a Christmas present; but as they are not known personally to them they are requested to make themselves known in the form of an application for a paper knife. It is in phosphor bronze and is being sent out as an appropriate reminder that Messrs. Clifford are specialists in phosphor bronze, manganese bronze and gun metal.



### NEW COMPANY REGISTERED.

Sopwith Aviation Co., Ltd., Canbury Park Road, Kingston-on-Thames.—Capital £26,000, in £1 shares (6,000 6 per cent. cum. pref. and 20,000 ordinary). Acquiring the business carried on at Kingston-on-Thames and Brooklands, both in Surrey, as the Sopwith Aviation Co. First directors, Thos. O. M. Sopwith, Miss Gertrude M. Sopwith, and Reginald O. Cary.



### Aeronautical Patents Published.

Applied for in 1912.

Published December 24th, 1913.

20,317. A. K. HILLSON. Propellers for ships, airships, &c.  
27,187. H. J. THOMAS AND BRITISH AND COLONIAL AEROPLANE CO., LTD. Speed indicator.

Applied for in 1913.

Published December 24th, 1913.

16,310. G. THOFEN. Air-ship shed.

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